SB4256E01
Jan. 2008

Vehicle System

Disassembly & Assembly

D20S-5, D25S-5, D30S-5, D33S-5, D35C-5
G20E-5, G25E-5, G30E-5
GC20E-5, GC25E-5, GC30E-5, GC33E-5
G20P-5, G25P-5, G30P-5, G33P-5, G35C-5
GC20P-5, GC25P-5, GC30P-5, GC33P-5

Important Safety Information

Most accidents involving product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Read and understand all safety precautions and warnings before operating or performing lubrication, maintenance and repair on this product.

Basic safety precautions are listed in the “Safety” section of the Service or Technical Manual. Additional safety precautions are listed in the “Safety” section of the owner/operation/maintenance publication.
Specific safety warnings for all these publications are provided in the description of operations where hazards exist. WARNING labels have also been put on the product to provide instructions and to identify specific hazards. If these hazard warnings are not heeded, bodily injury or death could occur to you or other persons. Warnings in this publication and on the product labels are identified by the following symbol.

⚠ WARNING

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.
Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Operations that may cause product damage are identified by NOTICE labels on the product and in this publication.

DOOSAN cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are therefore not all inclusive. If a tool, procedure, work method or operating technique not specifically recommended by DOOSAN is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance or repair procedures you choose.

The information, specifications, and illustrations in this publication are on the basis of information available at the time it was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service given to the product. Obtain the complete and most current information before starting any job. DOOSAN dealers have the most current information available.

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⚠ WARNING

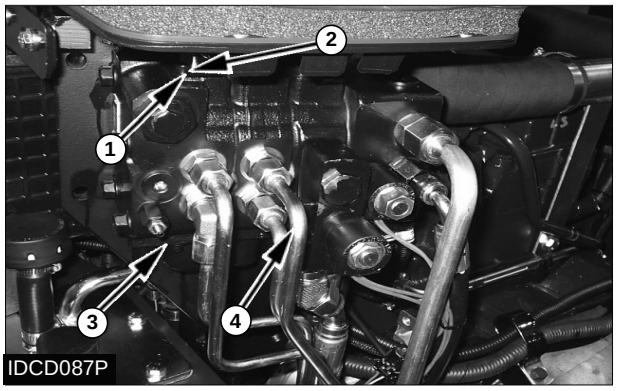
Disconnect batteries before performance of any service work.

Hydraulic Control Valves

Removal and Install ation

⚠ WARNING

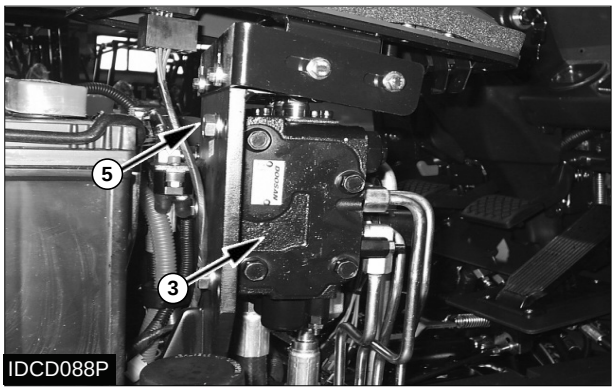
Hydraulic oil under pressure can remain in the hydraulic system after the engine and pump have been stopped. Personal injury can result if the pressure is not released before any work is done to the hydraulic system. To prevent possible personal injury, turn the engine off and move the control levers to make sure the hydraulic pressure is released before any fitting, plug, hose or component is loosened, tightened, removed or adjusted. Always move the lift truck to a clean and level location away from the travel of other machines.



NOTE : For purposes of reassembly, put identification marks on all lines, tubes and hoses before any disconnections are made.

1. Disconnect seven lines (4) from control valve (3).

2. Remove the cotter pins, washers and pins (1) from linkages (2).



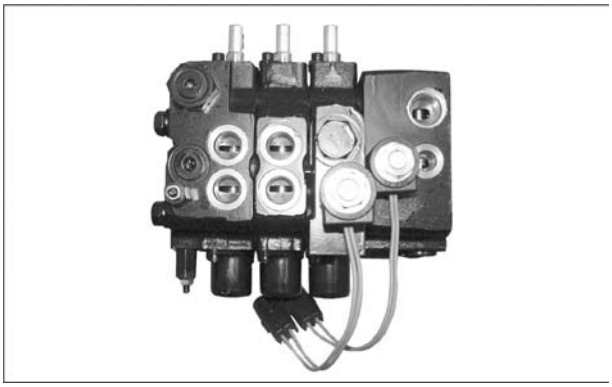
3. Support control valve (3). Remove three bolts (5), nut and control valve (3).

4. Install the control valve in the reverse order of removal.

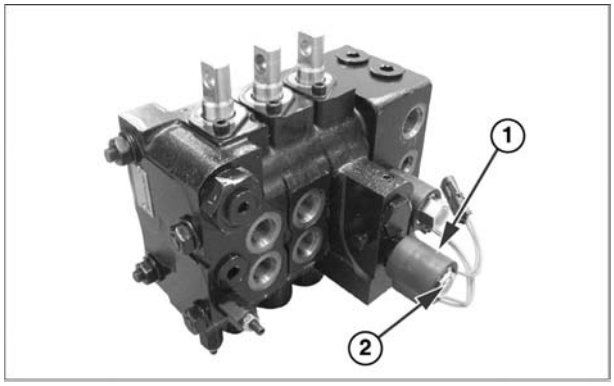
5. Fill the hydraulic tank to the correct level with fluid. Refer to the Operation And Maintenance Manual for further information.

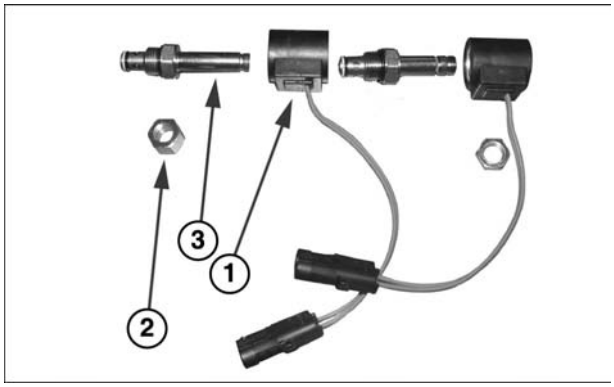
Disassembly of Hydraulic Control Valve

Start By :
a. Remove hydraulic control valve.

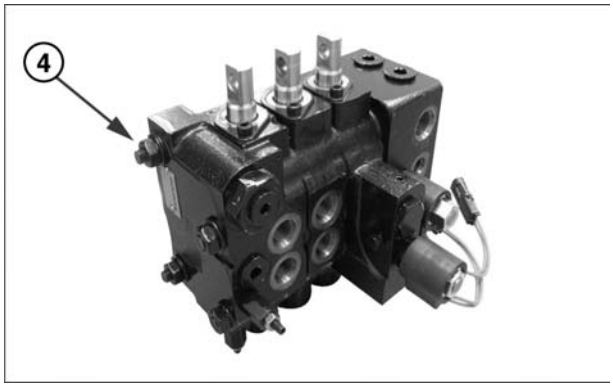


NOTICE : For the sake of convenience in assembly, put an identification mark on all valves.
Cover the all openings with plug to protect from dirt and dust.

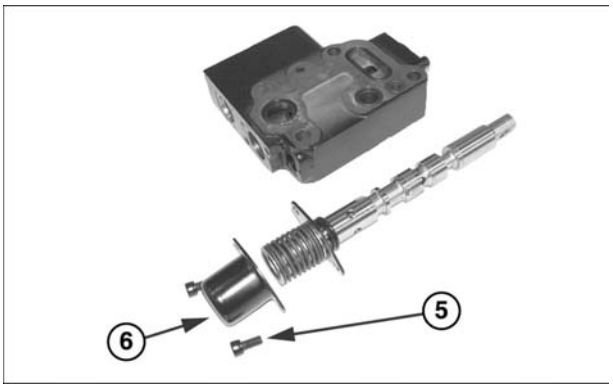




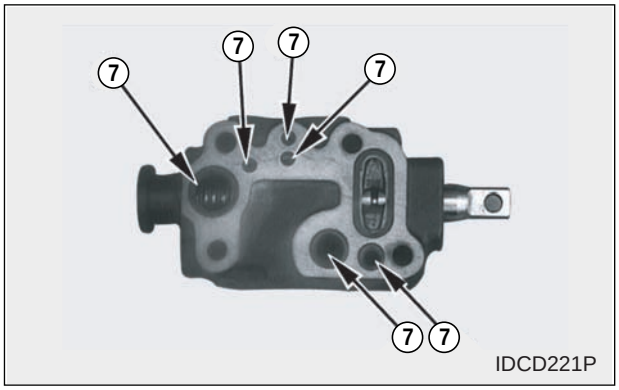
1. If necessasy, release the nut (2) and separate the solenoid valve (1) from plunger (3).



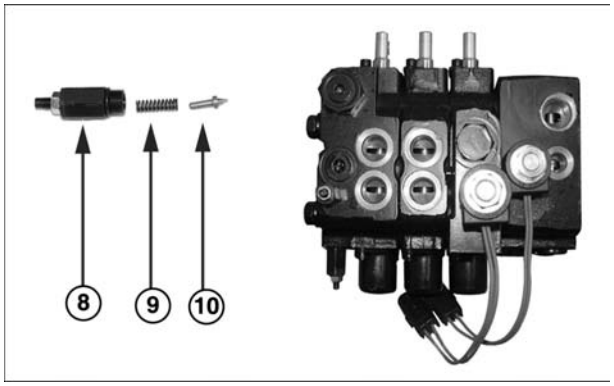
2. Release the bolt (4) and take apart the valve sections.



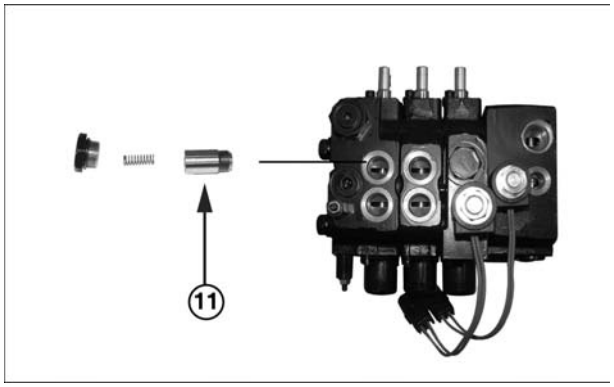
3. Release the screw (5) and separate return cap from valve. Then, remove the spool from the valve in downward direction (cap side).



4. Separate O-ring seals (7) from valve body.
Be careful not to miss the small spring and ball.



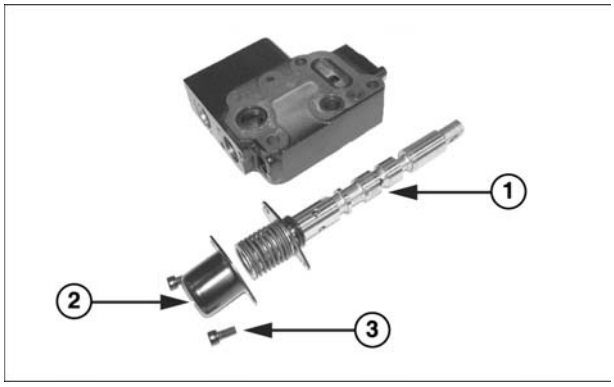
5. Take apart the relief valve into plug (8), spring (9) and poppet (10).



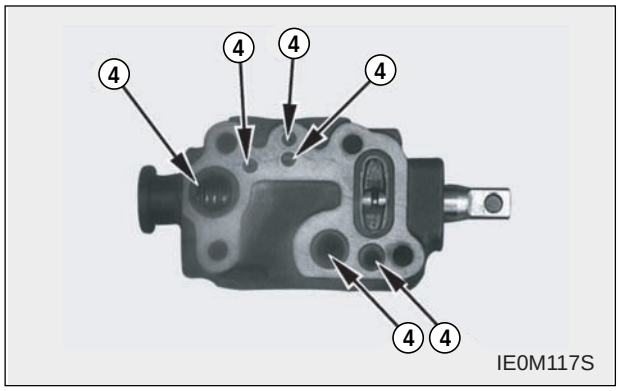
6. If necessary, separate the lift lock valve (11) from the lift block.

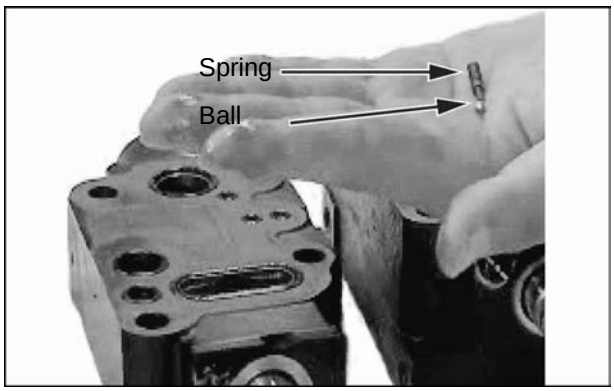
Assembly of Control valve

1. Make sure that all valve parts are clean and free from dirt and dust.

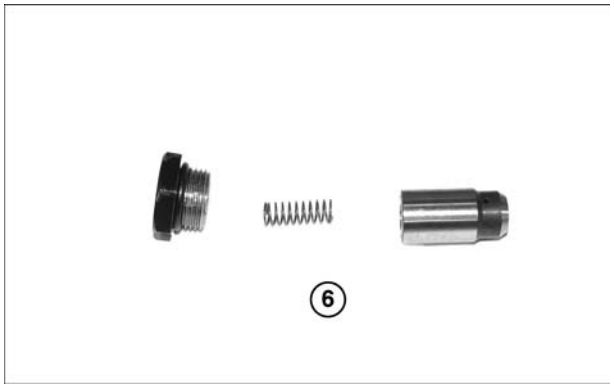


2. Assemble the spool (1), return cap (2) and valve section, then fasten the screw (3). Replace seals with the new one in case of leakage from cap side or spool side caused by dent or scar on spool

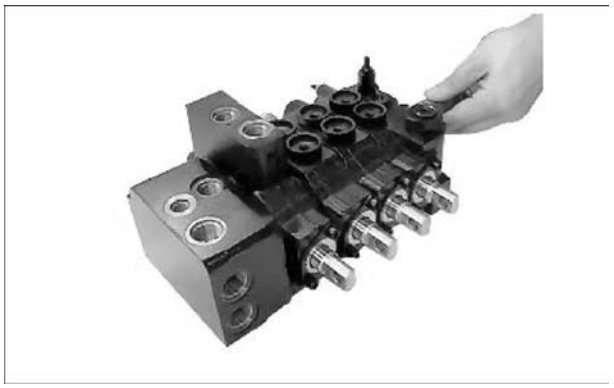


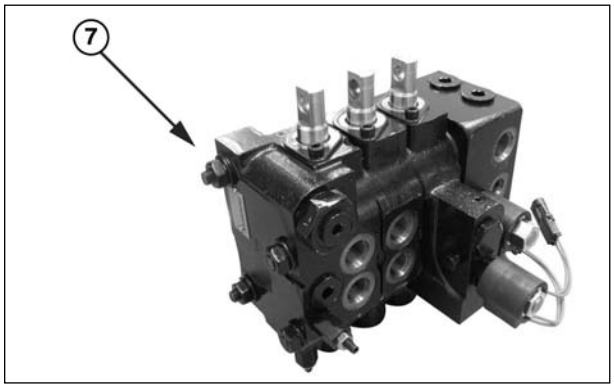


3. Install O-ring seals (4) on the valve body. Make sure that the small ball and spring are installed.

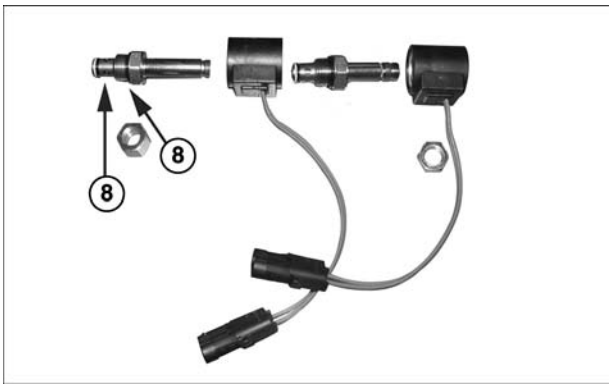


4. Dust and dirt should be cleaned when you assemble and disassemble the lift lock valve

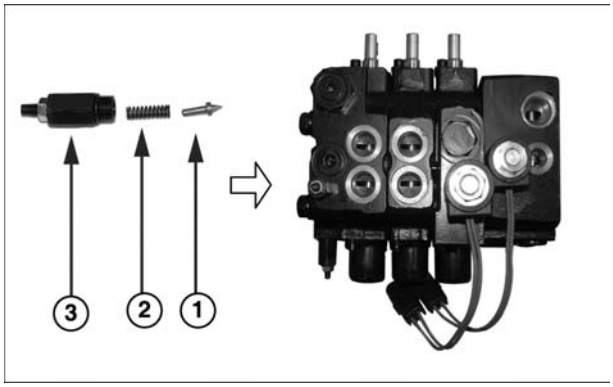




5. Install and tighten the tie rods (7). Be sure that you have to tighten the tie rods to the proper torque.



6. Install solenoid valve on the lift section. Before assembly, inspece the O-rings (8) and replace damaged or worn O-rings with new ones.



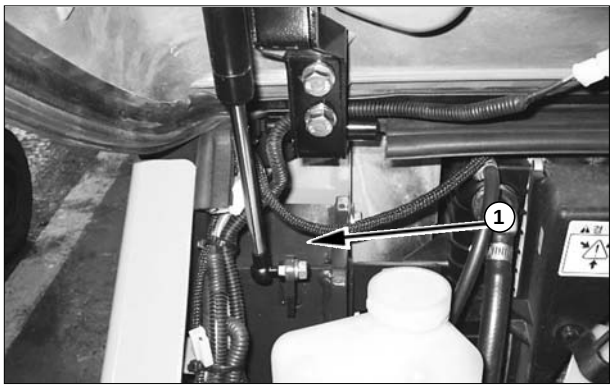
7. Assemble the poppet (1), spring (2), relief plug (3) into relief valve. Inspect the poppet and replace it with new one if it has scar or dent.

NOTE : Until the repaired valve is mounted on the lift truck, be sure to plug all openings.

Disassembly & Assembly

Hood (with seat)

Remove & Install Hood (with seat) Assembly



⚠ WARNING

The hood and seat assembly can fall when nut (1) is removed from the support cylinder rod. To avoid personal injury, support the seat and hood assembly before removing nut (1).

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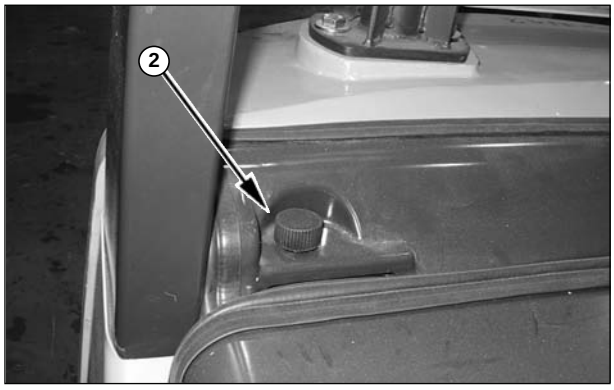
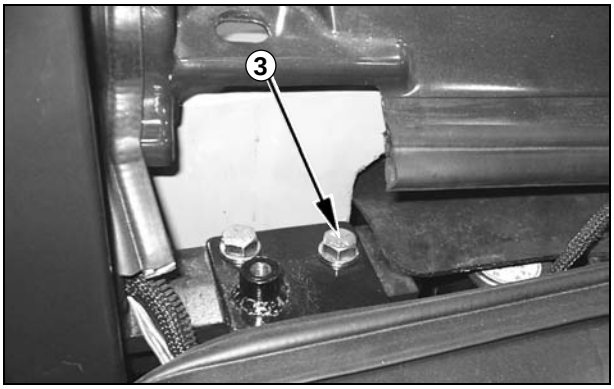
1. Raise the hood. Support the hood with a hoist.

2. Remove nut (1) from the support cylinder. Remove the cylinder rod from the bracket.

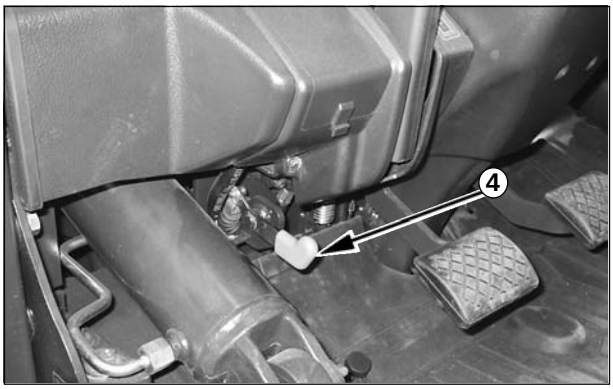
3. Lower the hood.



4. Remove the bolts (2) from the cover. Remove cover.



5. Remove the washers and four bolts (3).



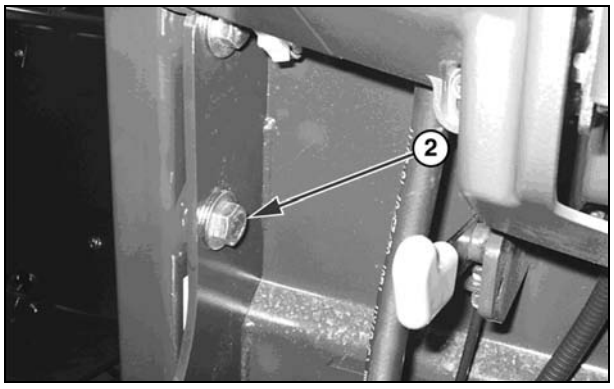
6. Release latch (4). Use the hoist to remove hood and seat assembly. The hood and seat assembly weighs approximately 52 kg (115 lb).

7. Install the hood and seat assembly in the reverse order of removal.

Overhead Guard

Remove & Install Overhead Guard

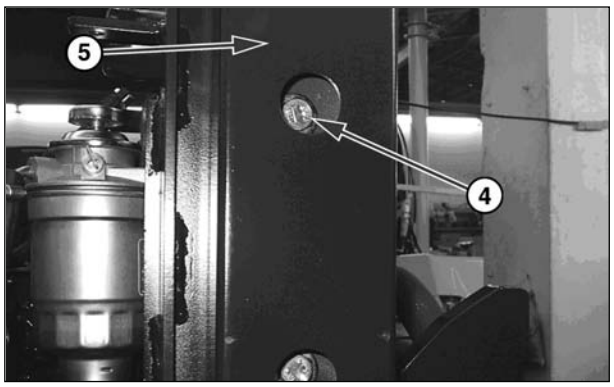
1. Support overhead guard (1) with lifting straps and a hoist.



2. Remove the washers, nuts, and two bolts (2).

3. Remove the washers, nuts, and two bolts (3).

4. Remove front overhead guard (1), Front overhead guard (1) weighs approximately 30 kg (66 lb).



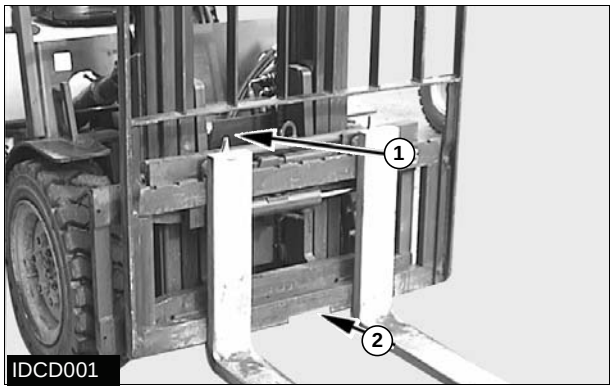
5. Remove the washers, nuts, and four bolts (4).

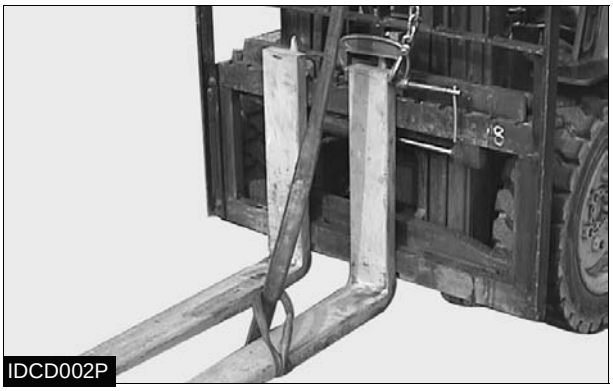
6. Remove rear Leg (5).

7. Install front overhead guard (1) and rear leg (5) in the reverse order of removal.

Forks

Remove & Install Forks





1. Lift fork pin (1).

2. Use a suitable C-clamp, strap and hoist to support the fork as shown.

3. Slide the fork to slot (2) in the middle of the carriage.

4. Remove the fork. The weight of the fork is approximately 50 kg (110 lb).

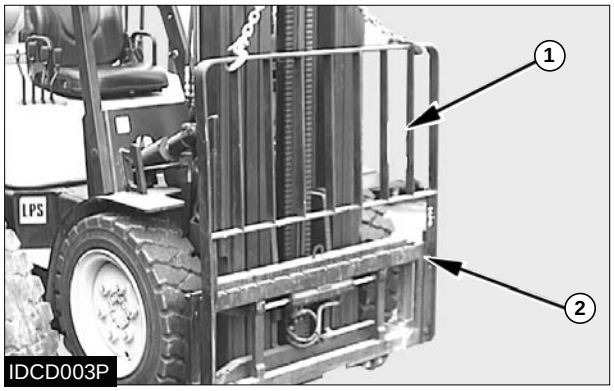
5. Repeat steps 1 through 4 for the remaining fork.

6. Install the forks in the reverse order of removal.

7. Put the forks in position. Lower both fork pins (1) to lock the forks in position.

Backrest

Remove & Install Backrest



1. Fasten a hoist to the backrest. Remove bolts (2) that fasten the backrest to the carriage.

2. Remove backrest (1). Backrest (1) weighs approximately 40 kg (90 lb).

3. Install backrest (1) in the reverse order of removal.

Carriage

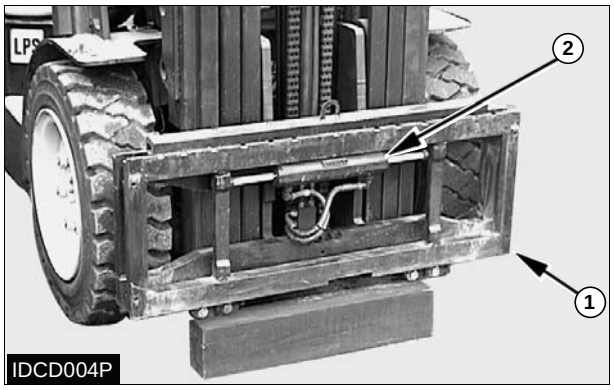
Remove & Install Carriage for STD, FFL & FFT

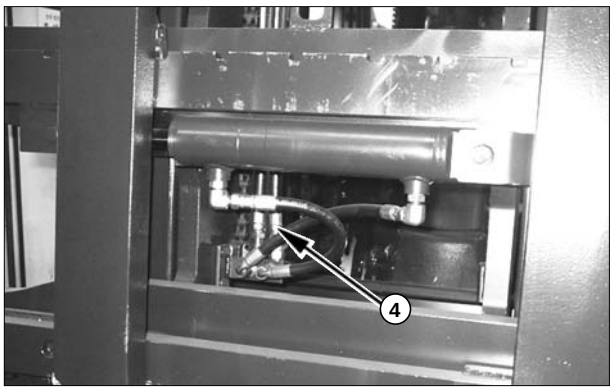
Tools Needed	A
Retaining Ring Pliers	1

Start By:

a. Remove forks.

b. Remove backrest.





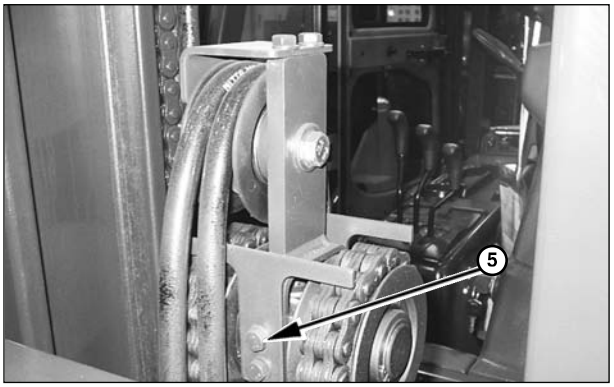
1. Raise carriage (1). Position a wooden block as shown. Lower carriage (1) onto the wooden block.

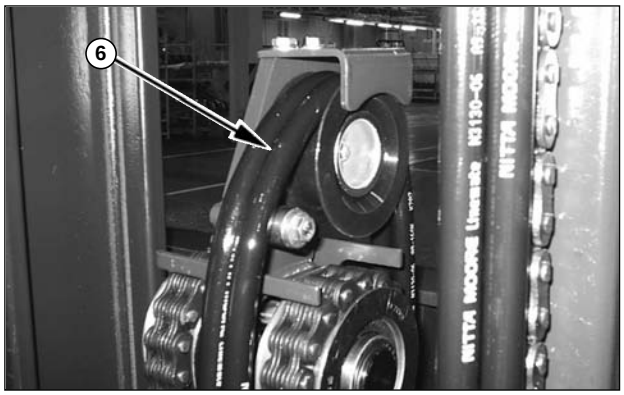
2. Disconnect two hydraulic lines (4) from side shifter cylinder (2). Plug and cap all openings to prevent contamination and debris from entering system.

⚠ WARNING

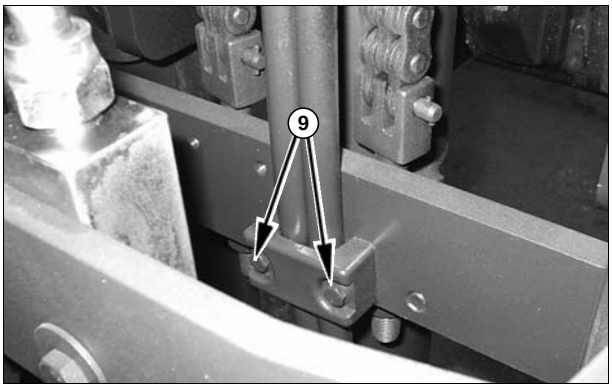
To prevent personal injury be sure pressure in the hydraulic system has been released before disconnecting any hydraulic lines. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

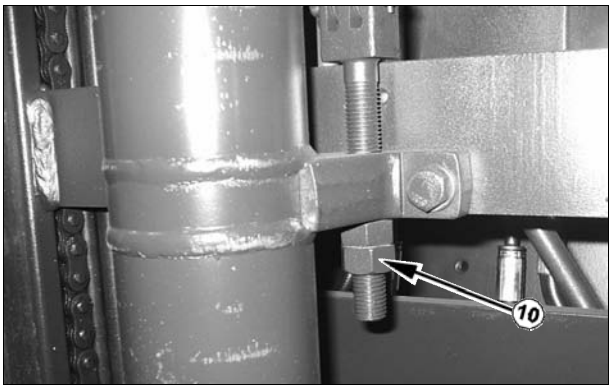
NOTE: For purposes of reassembly, identify and mark all hydraulic lines and connectors before removing or disconnecting.



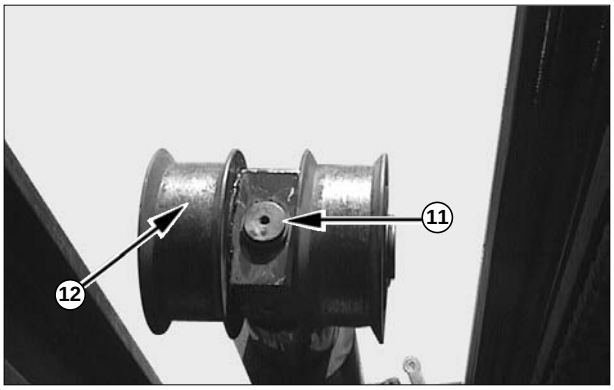


3. Remove four bolts (5) from the chain guard/hose support assembly (6). Set the hoses aside, clear from the primary cylinder and cross head.



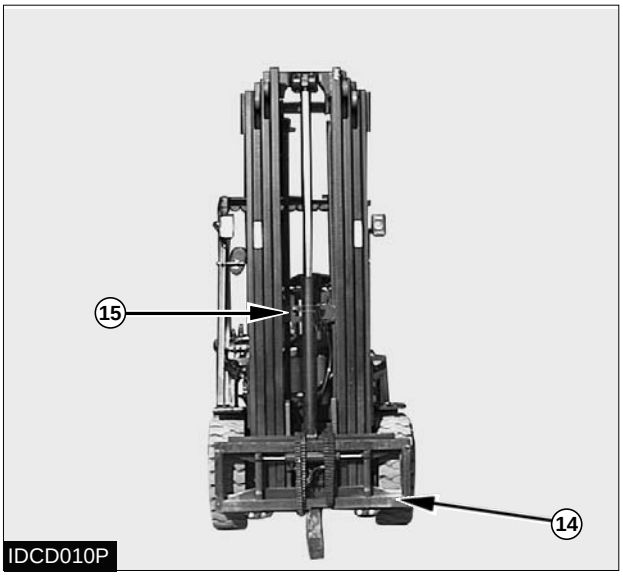


4. Remove two bolts (9) from the hose mounting bracket. Set the hoses aside. Remove two nuts (10) from the chain anchors. Set the chains aside, clear from the mast.



5. Use tool (A) to remove retainer ring (11) from the cross head shaft.

6. Remove cross head (12) from the shaft.

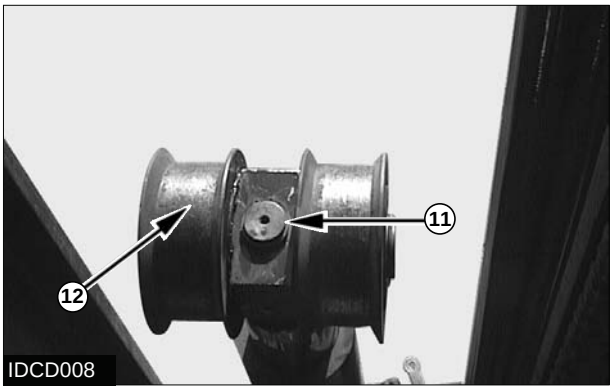


7. Raise the inner mast to pull out carriage as shown.

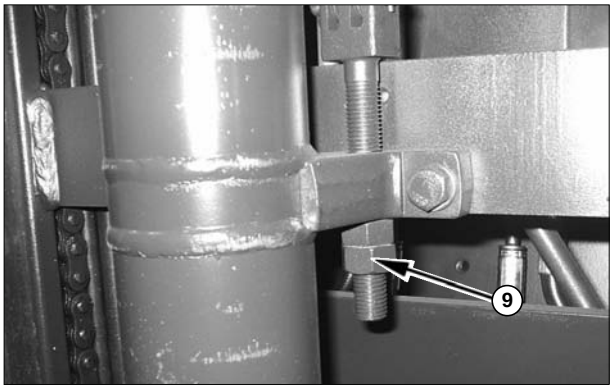
8. Remove carriage from bottom of inner mast (15). Carriage (14) weighs approximately 116kg (255 lb).

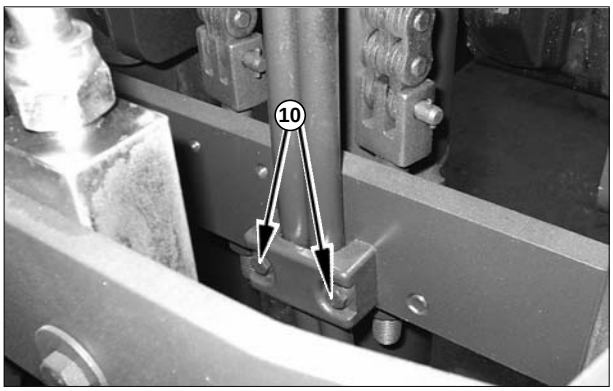
NOTE: Use the following steps to install the carriage.

9. Raise the inner mast to put in the carriage onto the mast, and lower the inner mast to cover carriage (1) bearing fully.

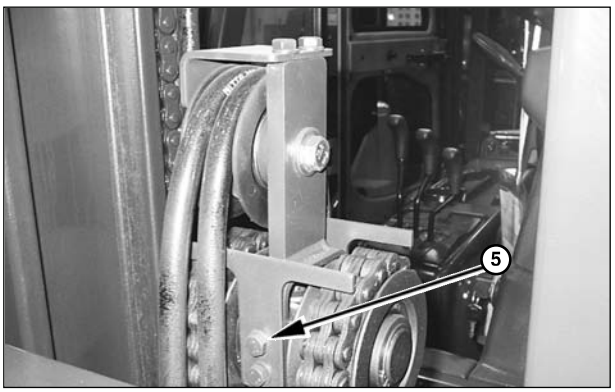


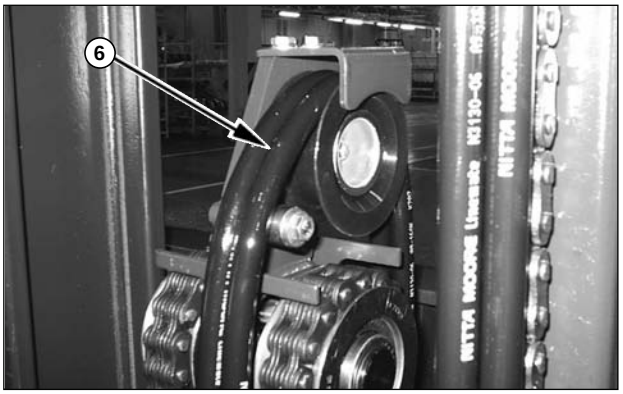
10. Install cross head (12) and retaining ring (11).



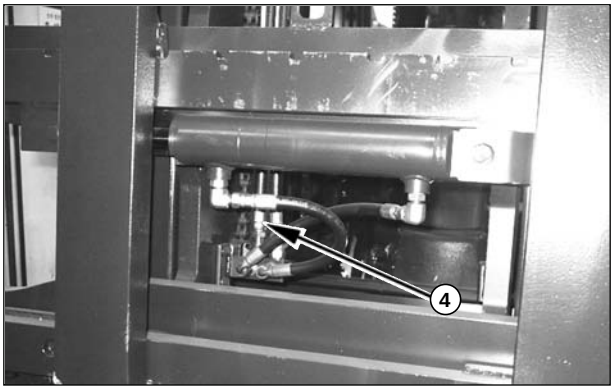


11. Put the chains in position over cross head (12). Install nuts (9) onto the chain anchors to a torque of **270 ± 40 N·m (200 ± 30 lb·ft)**.
Install bolts (10) onto the hose mounting bracket.





12. Install chain guard/hose support assembly (6) and four bolts (5) to a torque of **28 ± 7 N·m (20 ± 5 lb·ft)**.



13. Connect two hydraulic line (4) in their original positions.

End By:

a. Install backrest.

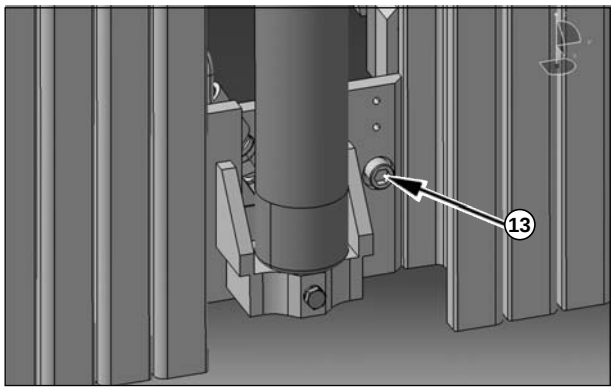
b. Install forks.

Remove & Install Carriage for Quad Mast

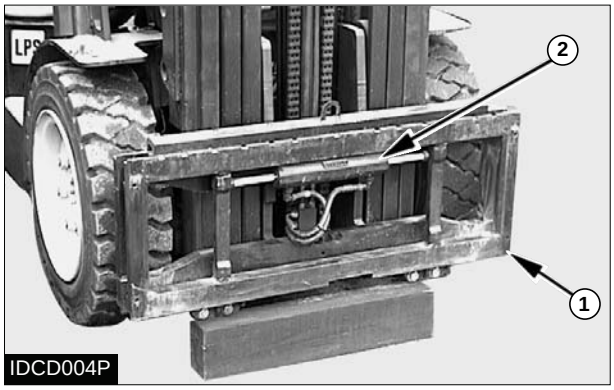
Start By:

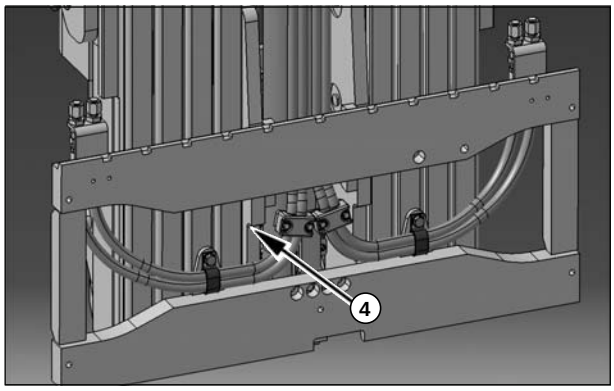
a. Remove forks.

b. Remove backrest.



1. Raise carriage and remove stopper bolts (13).





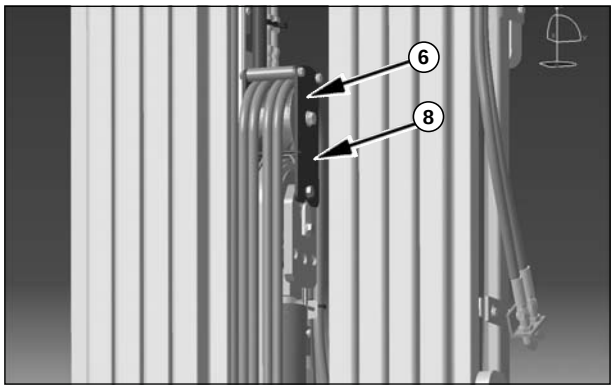
2. Raise carriage (1). Position a wooden block as shown. Lower carriage (1) onto the wooden block.

3. Disconnect two hydraulic lines (4) from side shifter cylinder (2). Plug and cap all openings to prevent contamination and debris from entering system.

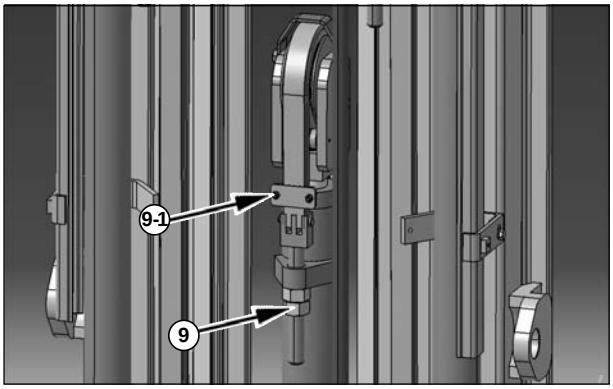
⚠ WARNING

To prevent personal injury be sure pressure in the hydraulic system has been released before disconnecting any hydraulic lines. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

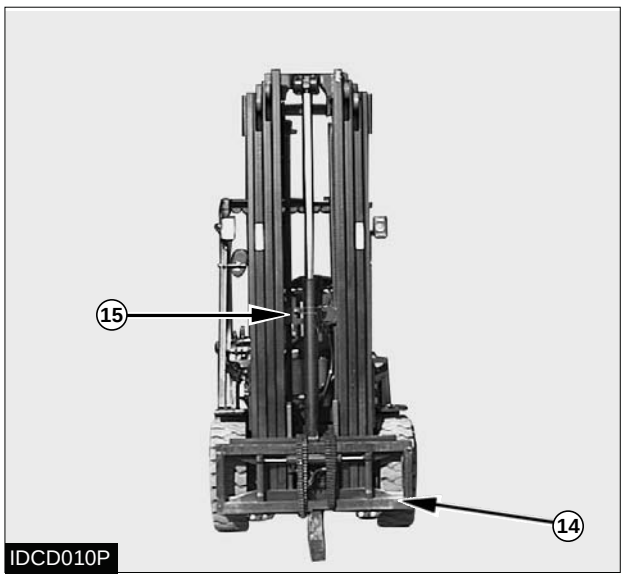
NOTE: For purposes of reassembly, identify and mark all hydraulic lines and connectors before removing or disconnecting.



4. Remove four bolts (8) from the chain guard/hose support assembly (6). Set the hoses aside, clear of the primary cylinder and cross head.



5. Set the hoses aside. Remove two nuts (9) from the chain anchors. And remove nuts (9-1) of clamp together. Set the chains aside, clear of the mast.

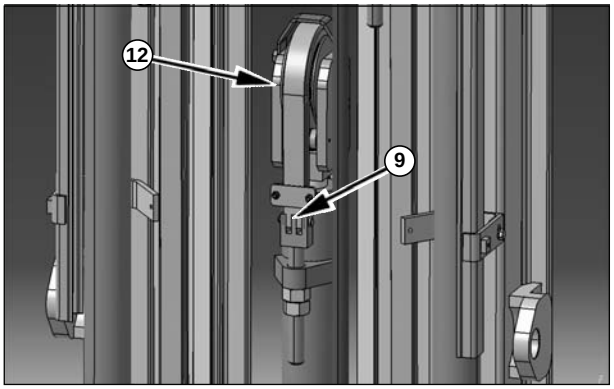


6. Raise the inner mast to pull out carriage as shown.

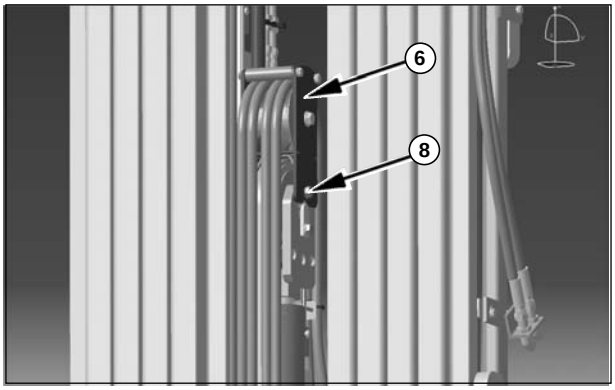
7. Remove carriage from bottom of inner mast (15). Carriage (14) weighs 116kg (255 lb).

NOTE: Use the following steps to install the carriage.

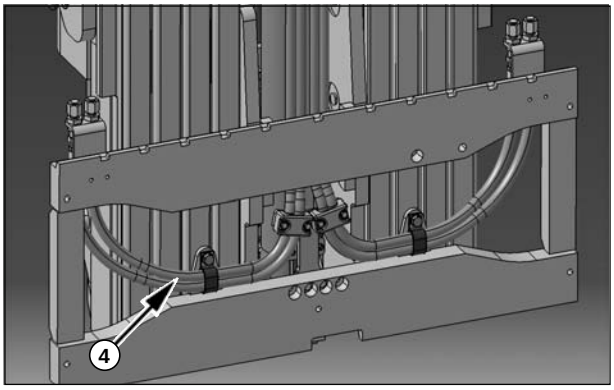
8. Raise the inner mast to put in the carriage onto the mast, and lower the inner mast to cover carriage bearing fully.



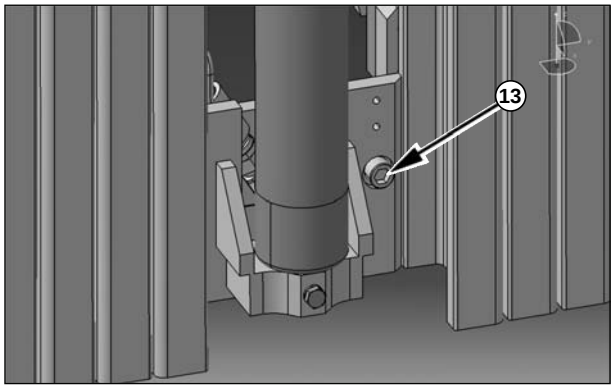
9. Put the chains in position over cross head (12). Install nuts (9) onto the chain anchors to a torque of 800 ± 100 N·m (600 ± 75 lb·ft).



10. Install chain guard/hose support assembly (6) and four bolts (8) to a torque of **28 ± 7 N·m (20 ± 5 lb·ft)**.



11. Connect two hydraulic line (4) in their original positions.



12. Install stopper bolt (13) on the inner mast.

End By:

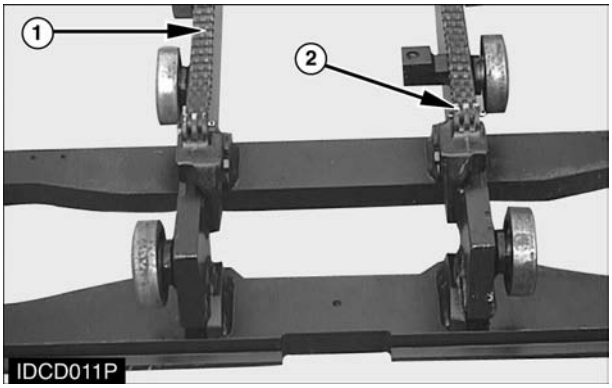
a. Install backrest.

b. Install forks.

Disassemble Carriage

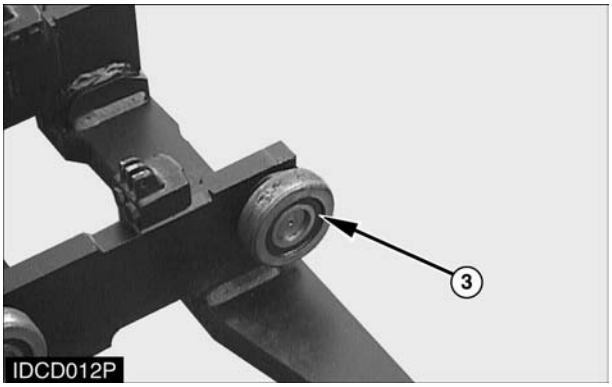
Start By:

a. Remove carriage.

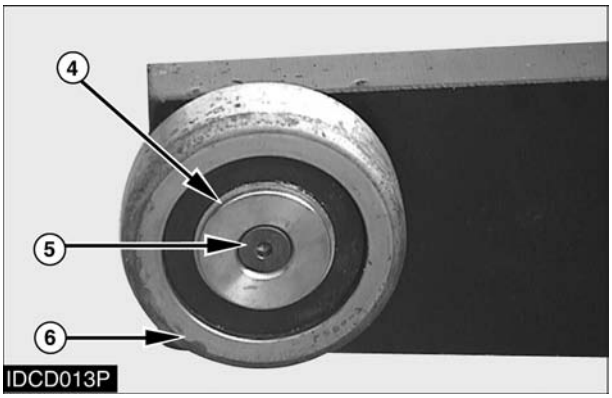


Typical Example

1. Remove the roll pins and pins (2) to disconnect chains (1).



2. Remove four lower roller bearings (3) and theshims from the carriage.



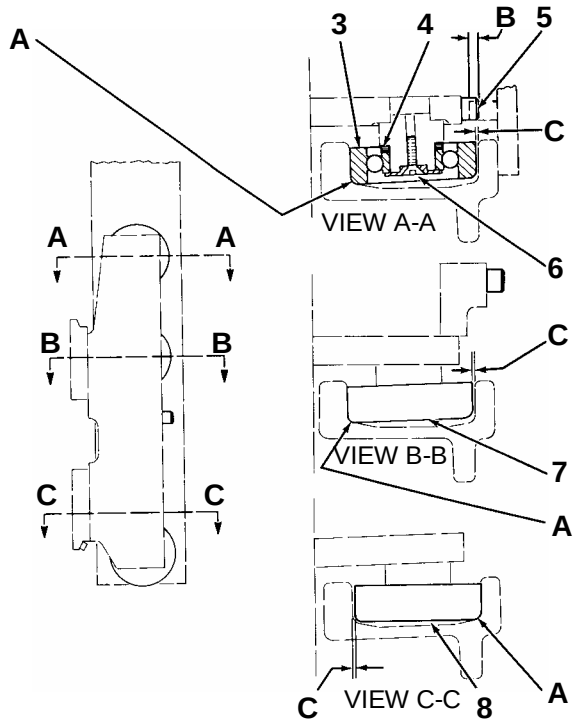
3. Remove screw (5) and washer (4). Remove toproller bearings (6) and the shims.

Assemble Carriage

NOTE: The standard, Full Free Lift and Full Free Triple Lift carriage load bearings are all adjusted the same way. The Full Free Triple Lift carriage is shown in the following illustrations.

To make the carriage clearance adjustments, carriage must be removed from the mast.

Use the procedure that follows to adjust carriage load bearings.



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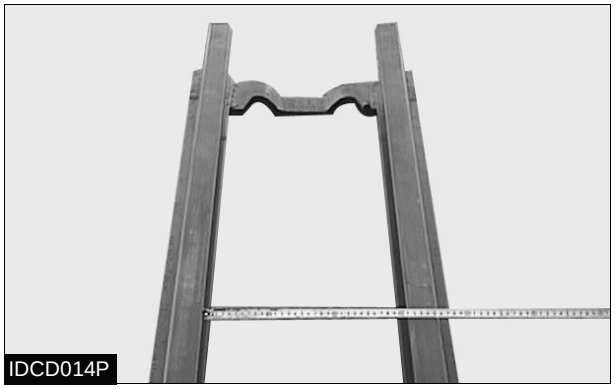
Carriage Adjustment
(3) Upper bearings. (4) Shims. (5) Bolt. (6) Screw. (7) Middle bearings. (8) Lower bearings. (A) Zero clearance. (B) 6.0 to 9.0 mm. (.236 to .354 in) clearance. (C) Minimum clearance.

1. Select lower bearings from the chart to obtain minimum clearance (B) between bearings and channel leg for full channel length. Use same bearing in all six locations.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D. *
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.276 in)
D581816	Over Size	110.7 mm (4.358 in)

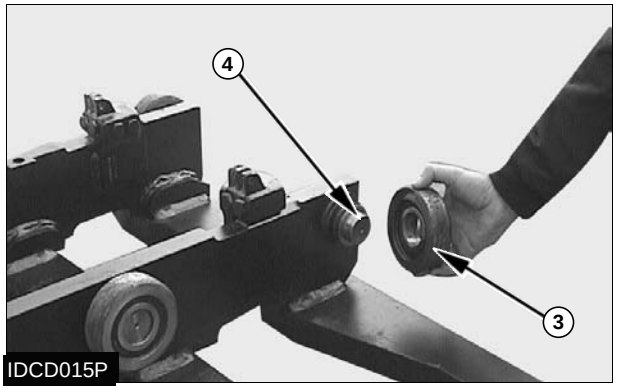
* Permissible tolerance ± 0.08 mm (.003in)

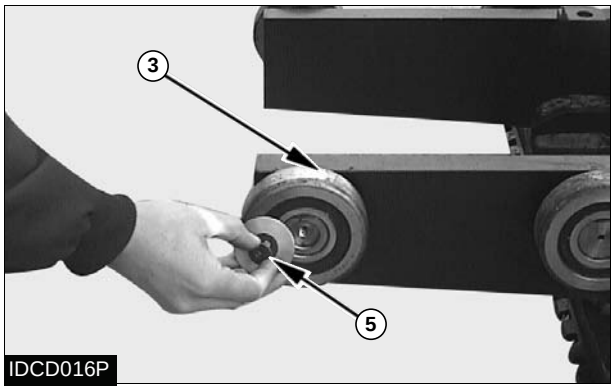


2. Find narrowest point by ruler on the inner mast in the area where the bearings make contact.

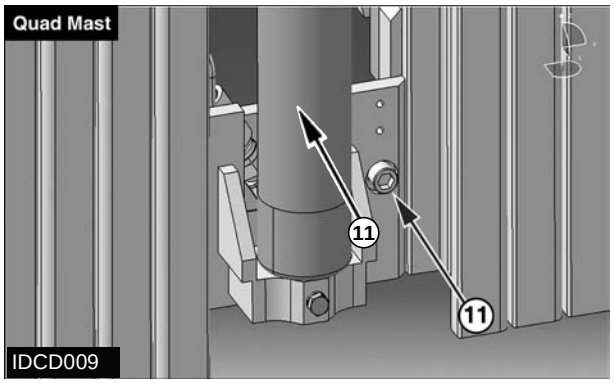
3. Install enough shims (4) that have been divided into two equal groups behind bearings (3). At installation, there is to be contact [zero clearance (A)] between the bearings and the narrowest point of inner mast.

4. Do step 2 through 3 for other sets of bearings (8), (9).



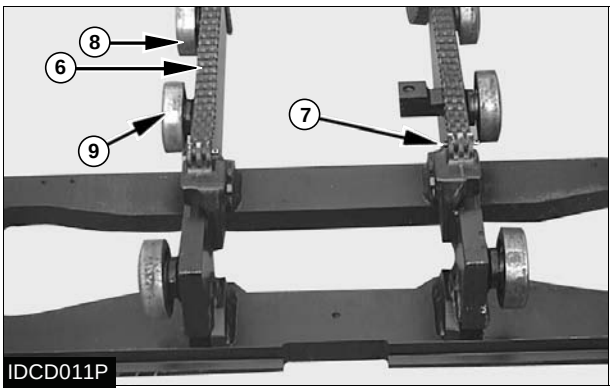


5. Tighten screw (5) that holds the top bearings to the carriage to a torque of 34 ±7 N·m (25 ±5 lb·ft)



⚠

6. In case of Quad mast shim stop bolt (11) as required to obtain a 6 to 9 mm (.24 to .35 in) lap with top carriage stop on the inner upright.



7. Position chains (6) on the carriage. Install pins (7) and the roll pins.

End By:

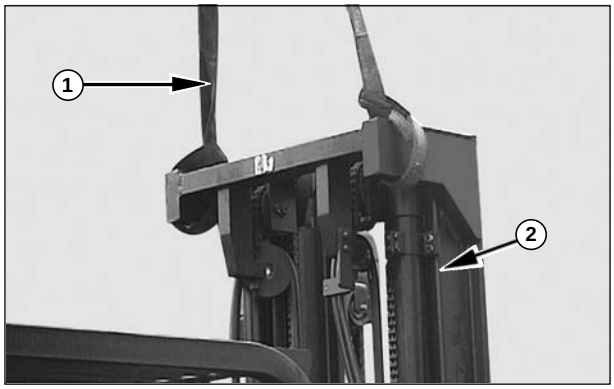
a. Install carriage, raise the inner mast and insert the carriage from the bottom of inner mast.

Mast

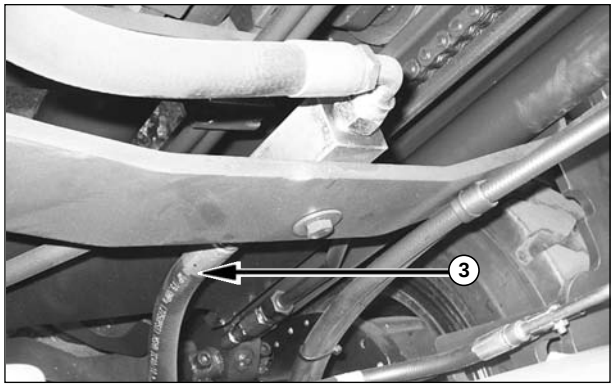
Remove & Install Mast

Start By:

a. Remove forks.



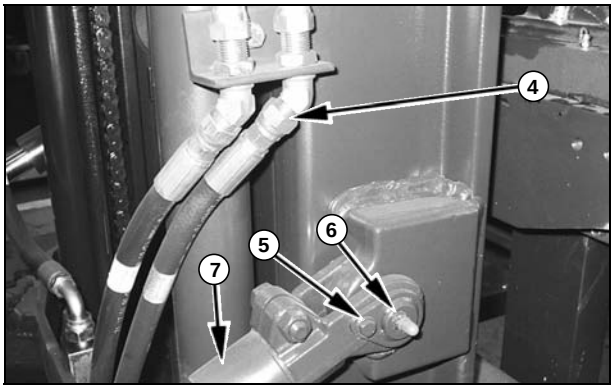
1. Support mast assembly (2) with a hoist and two straps (1) as shown.



NOTICE

Place identification marks on all hydraulic connectors and hoses to assure proper installation. Plug and cap all hydraulic connectors and hoses to avoid debris and contamination from entering the system.

2. Disconnect hose (3).



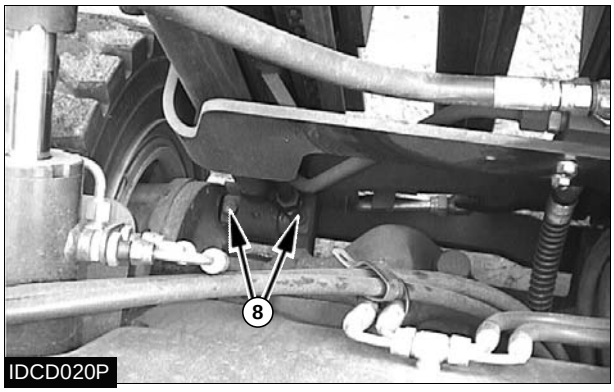
3. Disconnect two hydraulic lines (4).

⚠ WARNING

Tilt cylinders (7) can drop when pin (6) is removed. To avoid component damage or personal injury, support tilt cylinder (7) while removing pin (6).

4. Remove bolt (5) from each side of mast assembly (2).

5. Remove pin (6) from the tilt cylinders on each side of the mast assembly (2).



6. Tilt forward mast assembly (2) about 8° with the hoist. Remove bolts (8) from each side of the base of mast assembly (2).

⚠ WARNING

Loosen the tension of straps to be connected with hoist when mast assembly (2) is tilted forward. If straps are too tight, mast assembly (2) could slide off when bolts (8) are removed.

---

7. Use the hoist to remove mast assembly (2) from the machine.

8. Install the mast in the reverse order of removal.

End By:

a. Install forks.

b. Fill hydraulic oil to tank*.

* Refer to the Operation And Maintenance Manual for further information.

Disassemble Mast for FFT

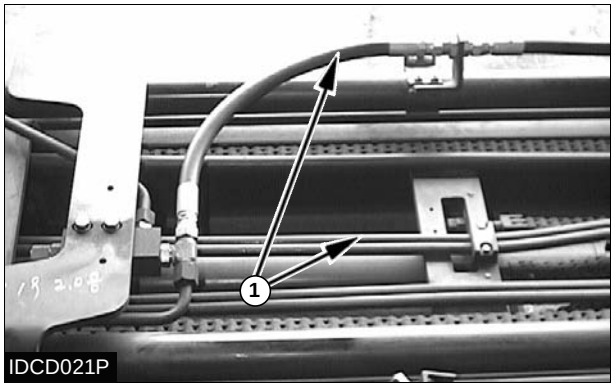
NOTE : The standard, Full Free Lift and Full Free Triple Lift mast are almost the same way. The mast shown in the following illustrations is the Full Free Triple Lift mast.

Start By:

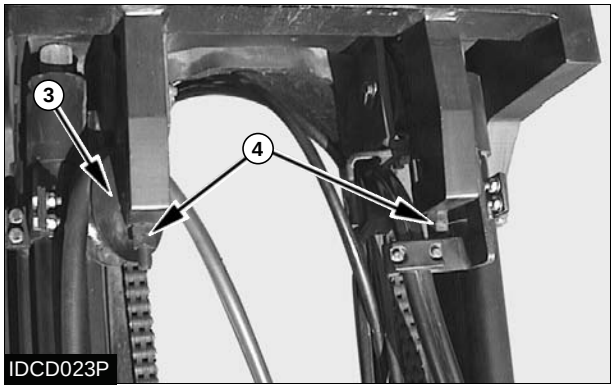
a. Remove primary lift cylinder.

b. Remove mast.

NOTE: The following disassembly and assembly procedure is for a full free triple lift mast.

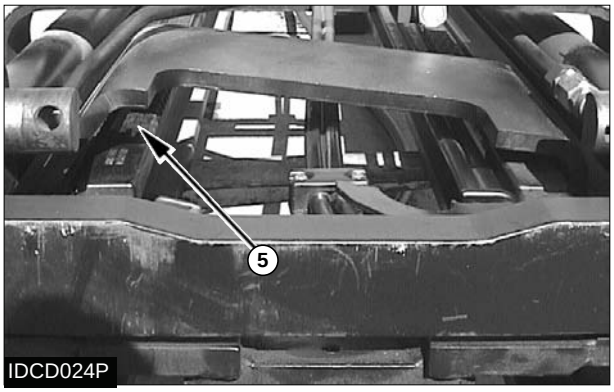


1. Remove hoses (1) along with the hose support clamps.

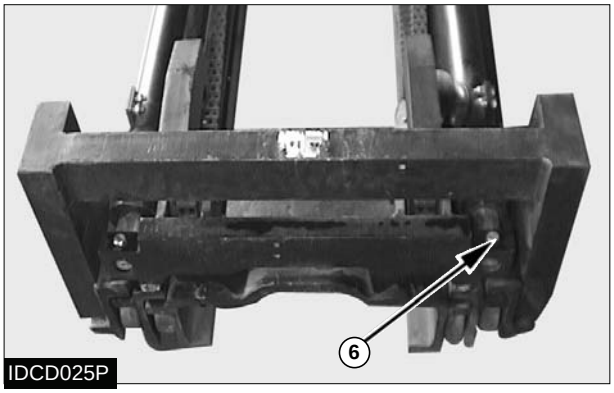


2. Remove hose sheave (3).

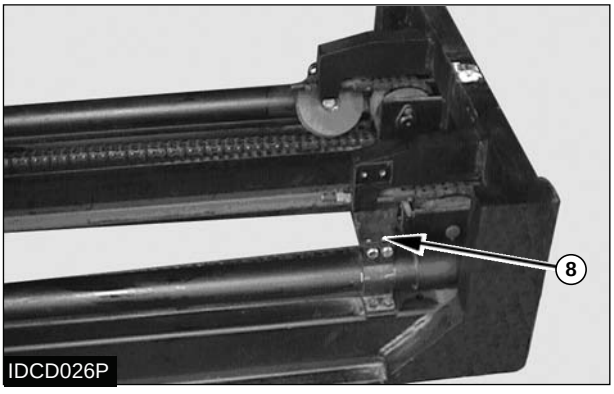
3. Remove chain nut (4) from the top of the mast (each side).



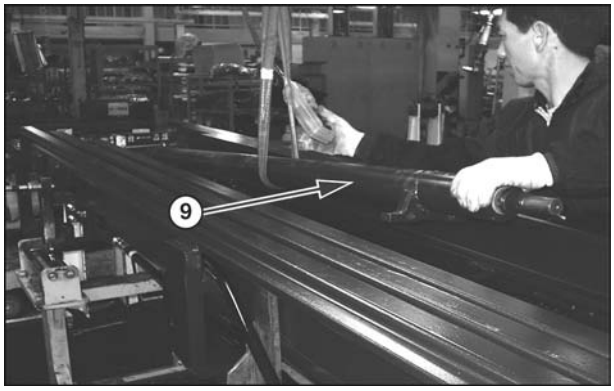
4. Disconnect and remove chains (5) from the bottom of the mast.



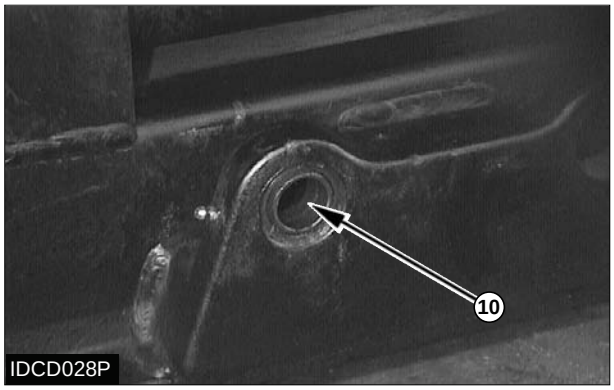
5. Remove top cylinder retainer bolt (6) from each side of the mast.



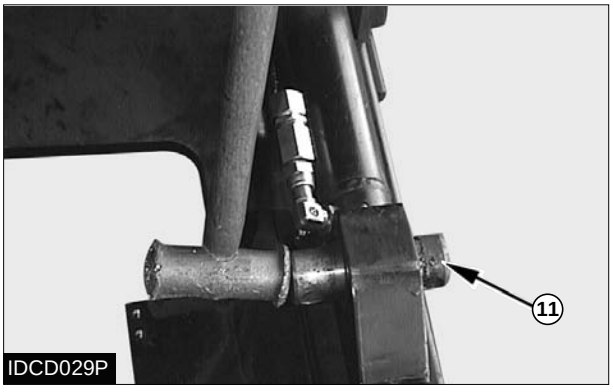
6. Remove cylinder retainer brackets (8) from each cylinder.



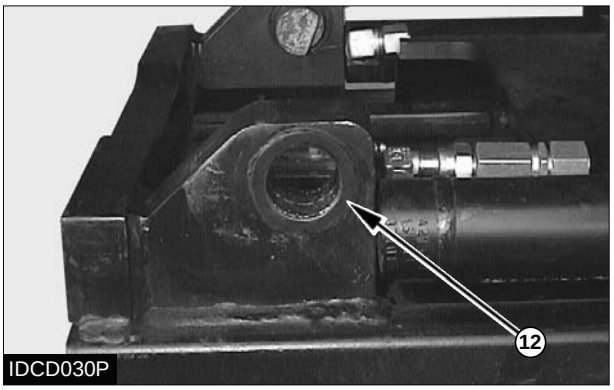
7. Fasten a nylon strap and hoist to secondary cylinder (9) as shown. Remove secondary cylinders (9). Each cylinder weighs 50 kg (110 lb).



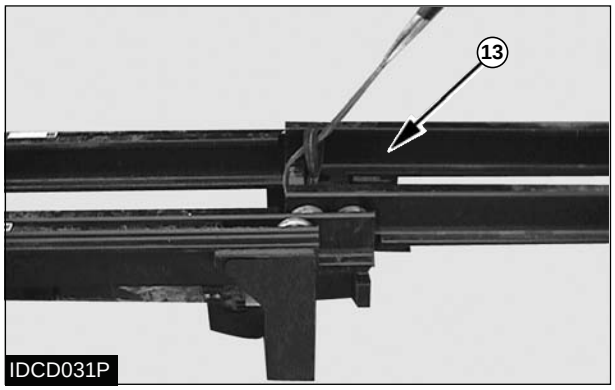
8. Check the condition of bearings (10) located in each of the tilt cylinder pin bores. Replace bearings (10) with new if worn or damaged.



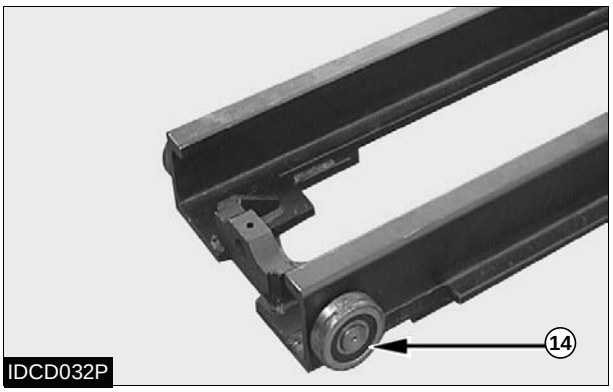
9. Remove mast mounting pins (11) from the mast mounting bores.



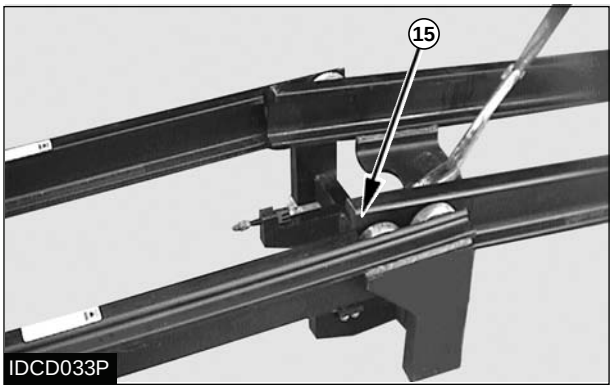
10. Check the condition of the bearings (12) located in each of the mast mounting bores.
Replace the bearings (12) with new if worn or damaged.



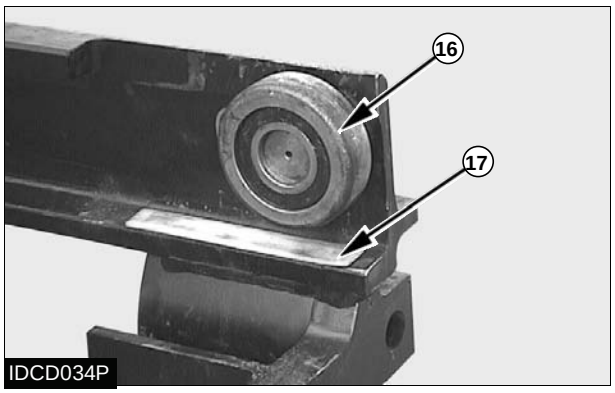
11. Fasten nylon straps and hoist to inner channel (13). Remove inner channel (13). The weight of the inner channel is 150kg (330 lb).



12. Remove rollers (14) and the shims from the inner channel mast.

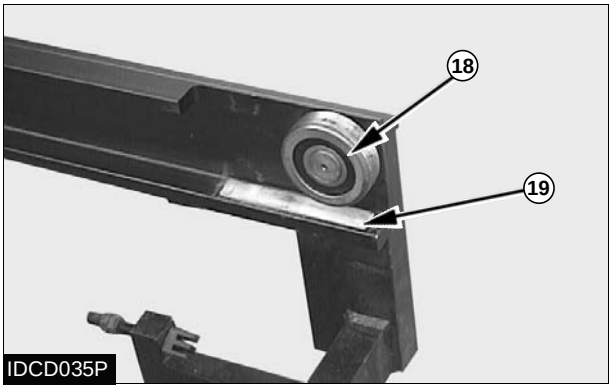


13. Fasten nylon straps and a hoist to the intermediate mast channel (15). Remove mast channel (15). The intermediate mast channel weighs approximately **168kg (370 lb)**.



14. Remove rollers (16) and the shims from the intermediate mast channel.

15. Remove nylon pads (17) and the shims.



16. Remove rollers (18) and the shims from the stationary mast channel.

17. Remove nylon pads (19) and the shims.

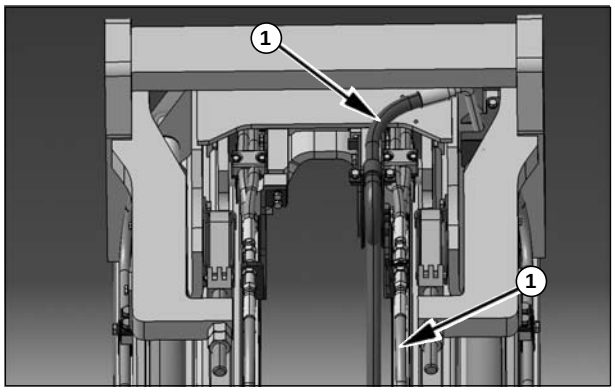
Disassemble Quad Mast

Start By:

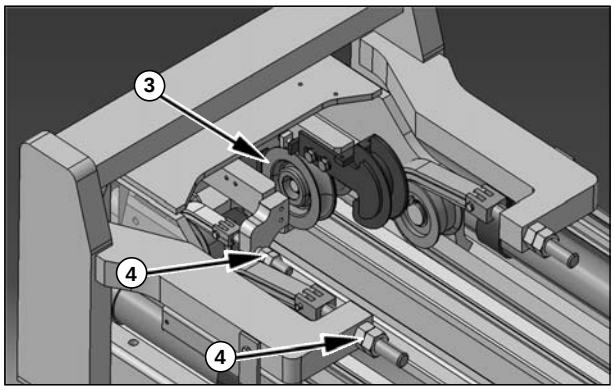
a. Remove primary lift cylinder.

b. Remove mast.

NOTE: The following disassembly and assembly procedure is for Quad Mast.

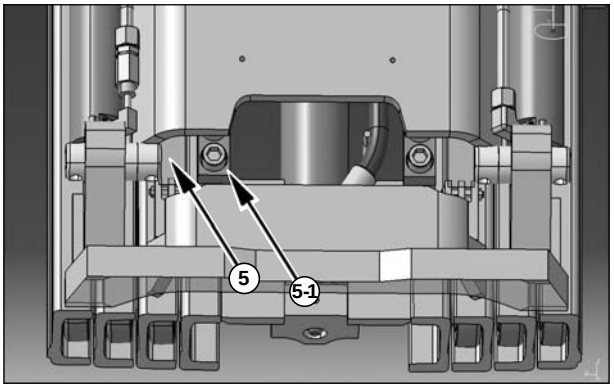


1. Remove all hoses (1) along with the hose support clamps.

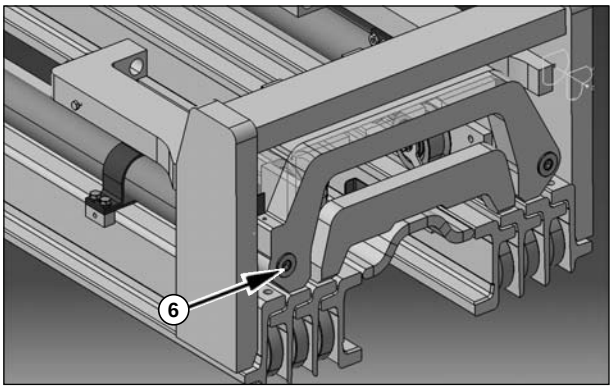


2. Remove hose sheave (3).

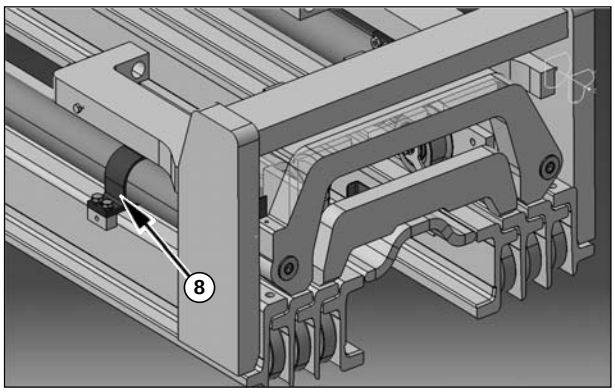
3. Remove chain nut (4) from the top of the mast (each side).



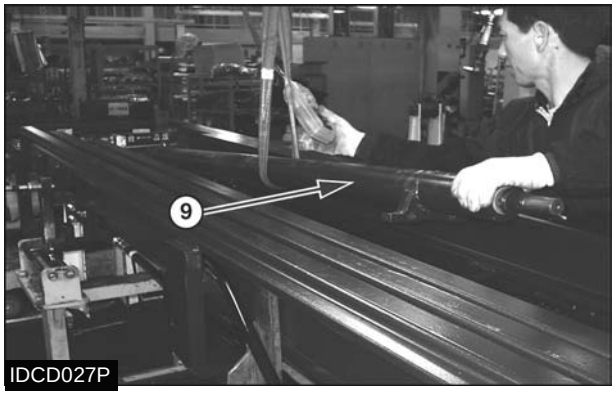
4. Disconnect and remove chains (5) and chain anchor block (5-1) from the bottom of the mast.



5. Remove top cylinder retainer bolt (6) from each side of the mast.

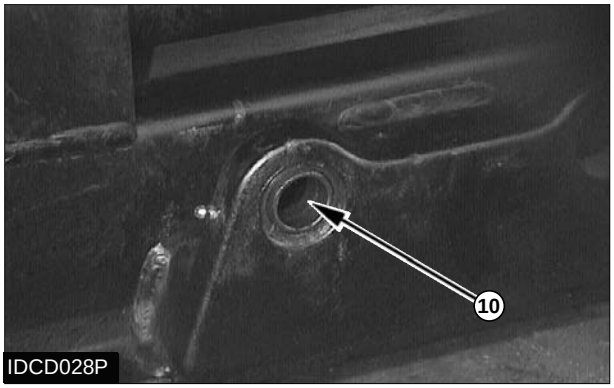


6. Remove cylinder retainer brackets (8) from each cylinder.

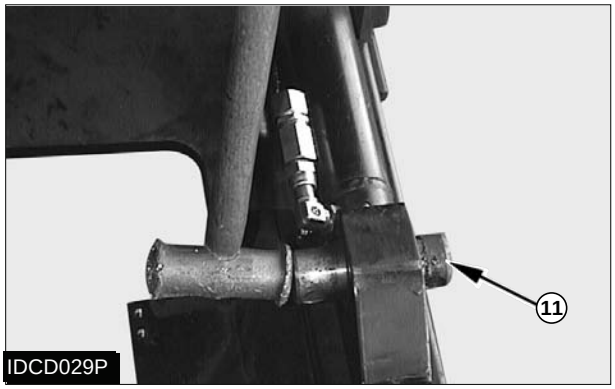


7. Fasten a nylon strap and hoist to secondary cylinder (9) as shown. Remove secondary cylinders (9). Each cylinder weighs 50 kg (110 lb).

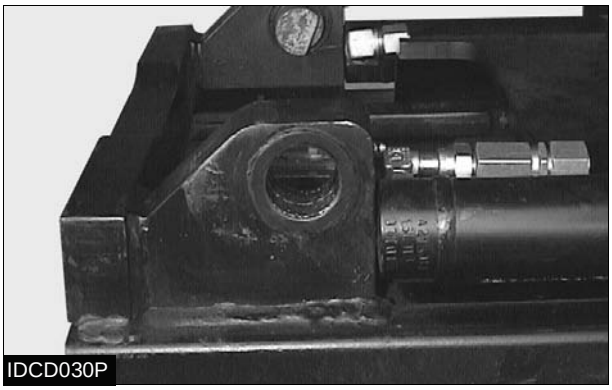
NOTE: LH, RH secondary cylinders are different. Identity or mark each cylinder for purpose of reassembly.



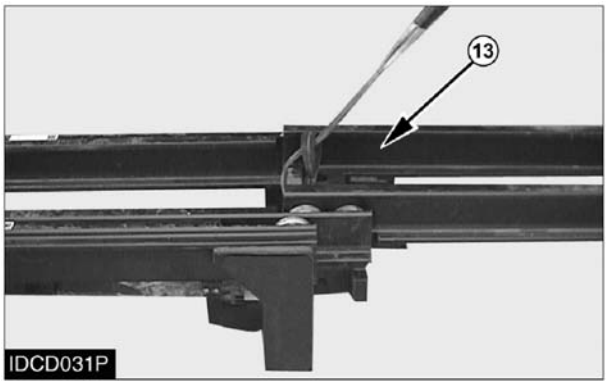
8. Check the condition of bearings (10) located in each of the tilt cylinder pin bores. Replace bearings (10) with new if worn or damaged.



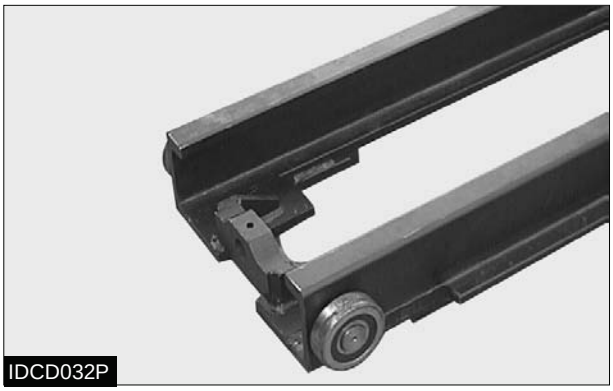
9. Remove mast mounting pins (11) from the mast mounting bores.



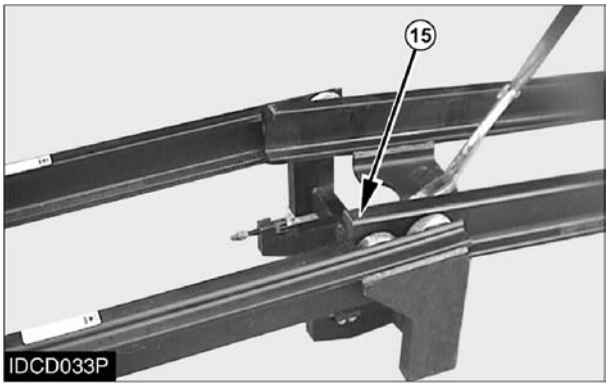
10. Check the condition of the bearings (12) located in each of the mast mounting bores.
Replace the bearings (12) with new if worn or damaged.



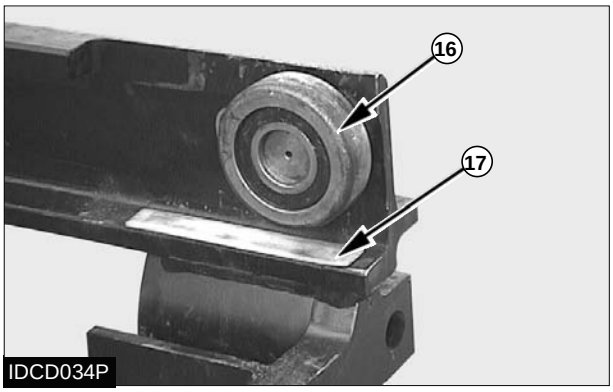
11. Fasten nylon straps and hoist to inner channel (13). Remove inner channel (13). The weight of the inner channel is 150kg (330 lb).



12. Remove rollers (14) and the shims from the inner channel mast.

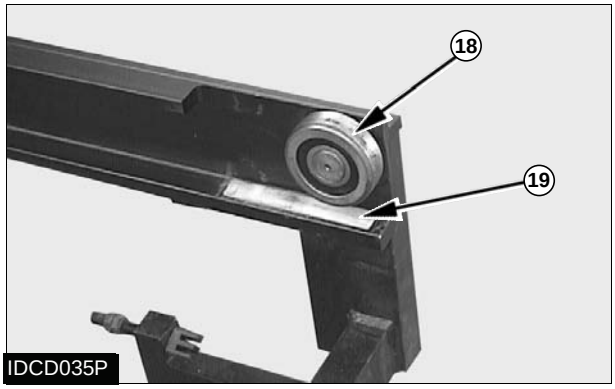


13. Fasten nylon straps and a hoist to the inner intermediate mast channel. Remove that mast channel and then remove the onter intermediate mast channel (15) in the same way. The each intermediate mast channel weighs 168kg (370 lb).



14. Remove rollers (16) and the shims from the intermediate mast channels.

15. Remove nylon pads (17) and the shims.



16. Remove rollers (18) and the shims from the stationary mast channel.

17. Remove nylon pads (19) and the shims.

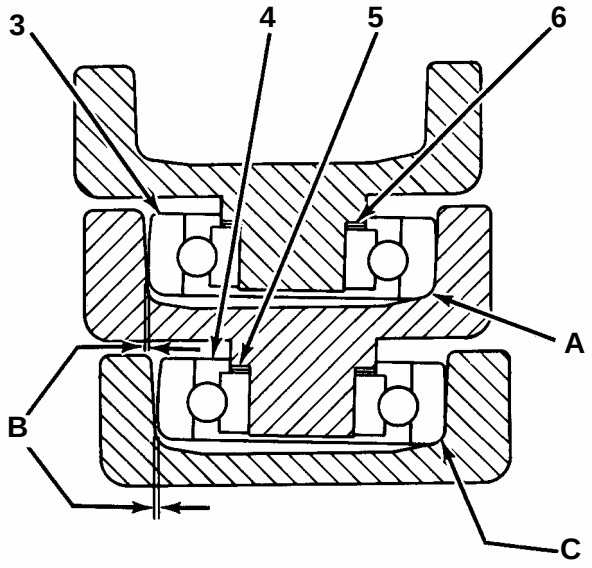
Assemble FFT Mast

NOTE: The standard, Full Free Lift and Full Free Triple Lift mast load bearings are all adjusted the same way. The mast shown in the following illustrations is the Full Free Triple Lift mast. Also, the actual appearance would be different partially

1. Make sure all parts are clean and free of dirt and foreign material.

2. Check all parts for damage, use new parts for replacement.

A. Lower Bearing Adjustment of Intermediate Mast



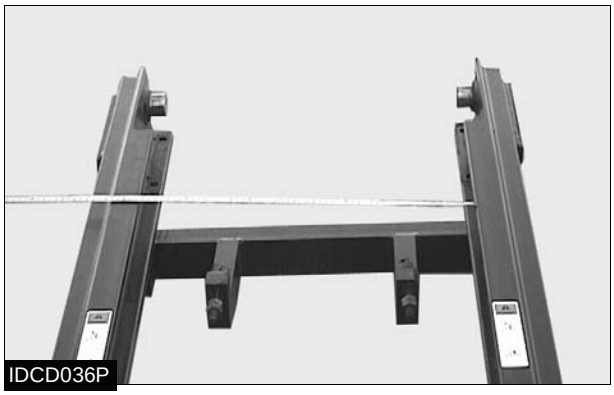
IDCS123S

Mast Adjustment Lower Bearings
(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

3. Select lower bearings (3) and (4) from the chart to obtain minimum clearance (B) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D. *
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.276 in)
D581816	Over Size	110.7 mm (4.358 in)

* Permissible tolerance ± 0.08 mm (.003 in)



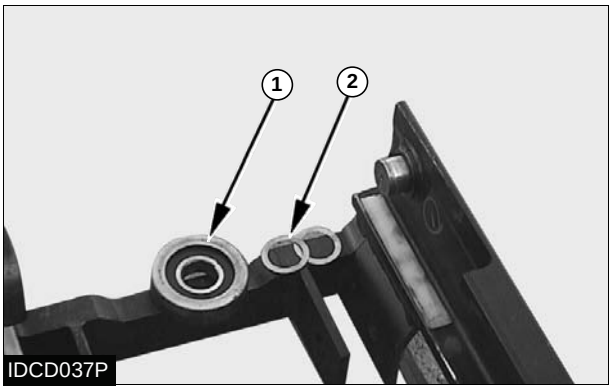
4. Find narrowest point by ruler on the staionary mast in the area where the bearings make contact at 475 mm (18.7 in) channel lap.

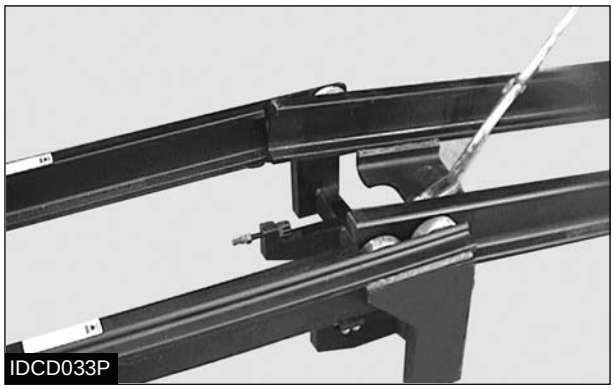
NOTE: When installing shims (2) behind bearings (1), make sure the amount of shim is divided equally when positioned behind each bearing (1).

5. Install the correct amount of shim (2) behind rollers until contact (zero clearance) is made between the rollers.

NOTICE

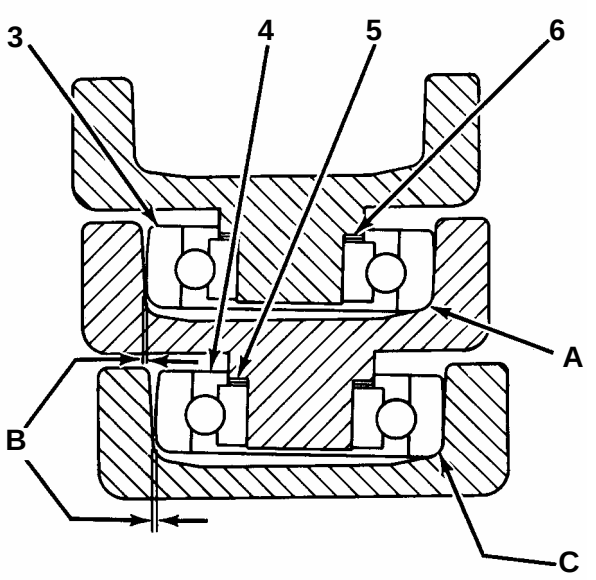
When the correct amount of shim has been installed behind rollers (1) there will be contact (zero clearance) between the rollers and the inner mast at most narrow point of mast (refer to step 4)





6. Install 1 mm shim to each bearing of intermediate lower and stationary upper basically. Lifting by crane, insert intermediate mast into stationary mast from the upper side.

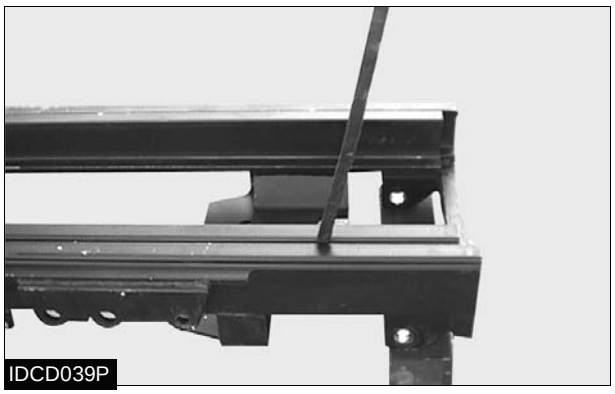
NOTE: When installing shims (5) behind bearings (4), make sure the amount of shim is divided equally when positioned behind each bearing (4).



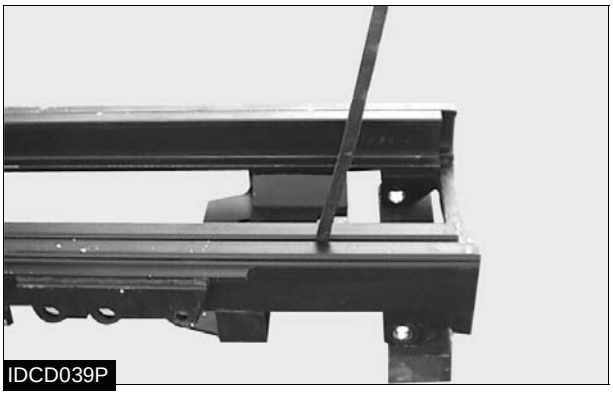
IDCS123S

Mast Adjustment Lower Bearings

(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance. (3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

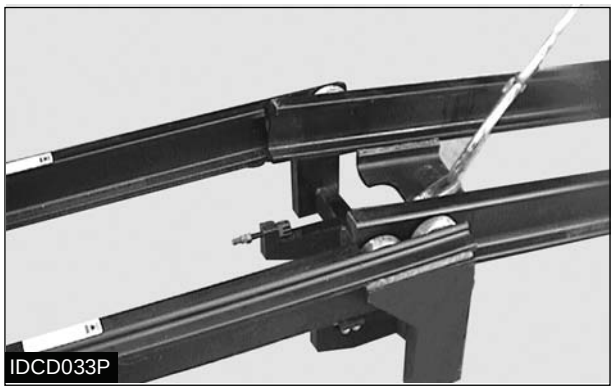


7. Make sure intermediate mast lower bearings are properly shimmed in the stationary mast by rolling up and down and moving intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both intermediate lower bearings.

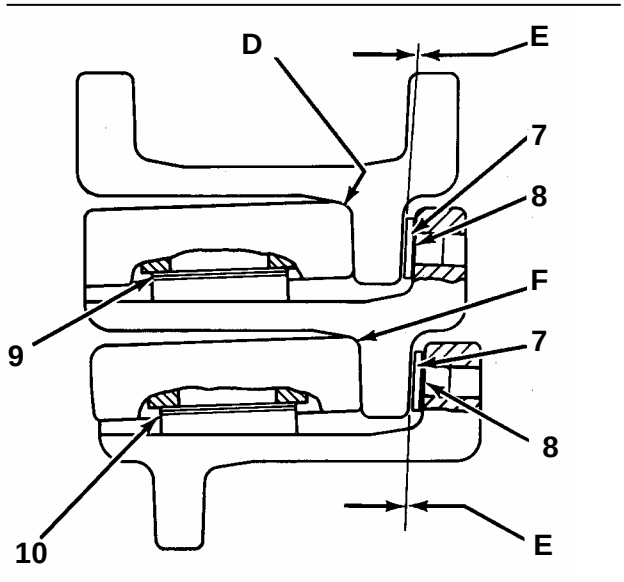


8. In case of standard and full free mast, inner lower bearings can be easily extruded by pulling down the inner mast from the bottom of stationary mast. If intermediate mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the intermediate mast from the stationary mast and remove shim 0.5 mm to both intermediate lower bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between intermediate lower bearings and stationary channel at approximately 475 mm (18.7 in) channel lap.

B. Upper Bearing Adjustment of Stationary Mast

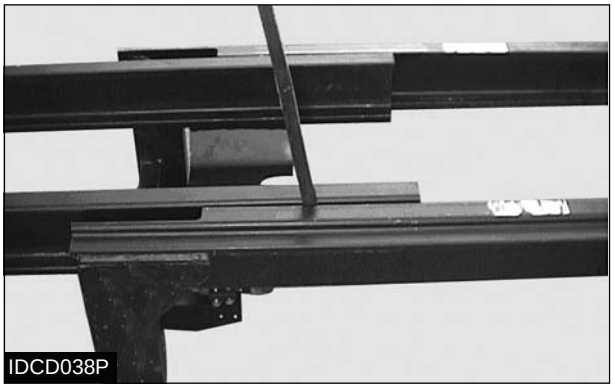


9. Lift by crane, and pull out intermediate mast from stationary mast. Install 1 mm shim to each bearing of stationary mast upper basically. Bearing should be selected D581814 under size bearing.

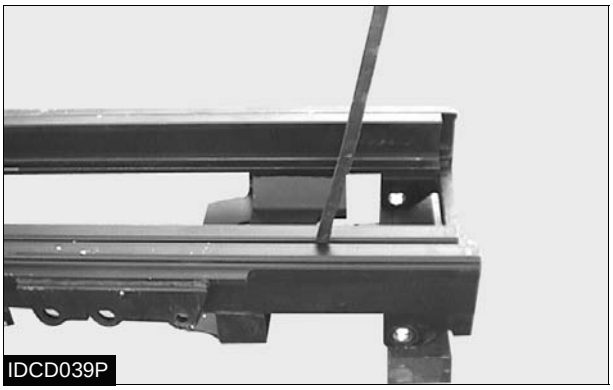


IDCS124S

Mast Adjustment Upper Bearings
(D) Zero clearance. (E) 0.80 mm (.031 in) Clearance maximum.
(F) Zero clearance. (7) Pads. (8) Shims. (9) Shims. (10) Shims.

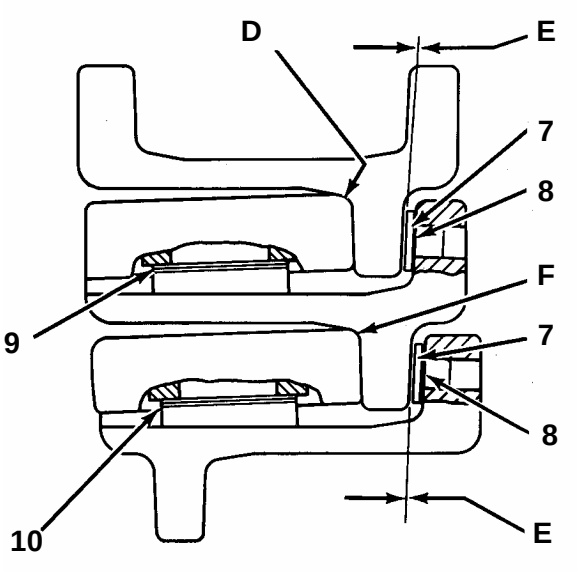


10. Make sure stationary mast upper bearings are properly shimmed by rolling up and down and moving intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both stationary upper bearings.



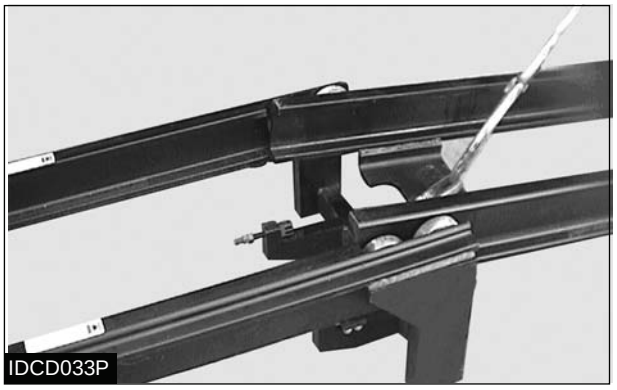
11. In case of standard and full free mast, stationary upper bearings can be easily extruded by pulling down the inner mast from the bottom of stationary mast. If intermediate mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the intermediate mast from the stationary mast and remove shim 0.5 mm to both stationary upper bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between stationary upper bearings and the widest point of intermediate mast to be checked before.

C. Upper Pad Adjustment



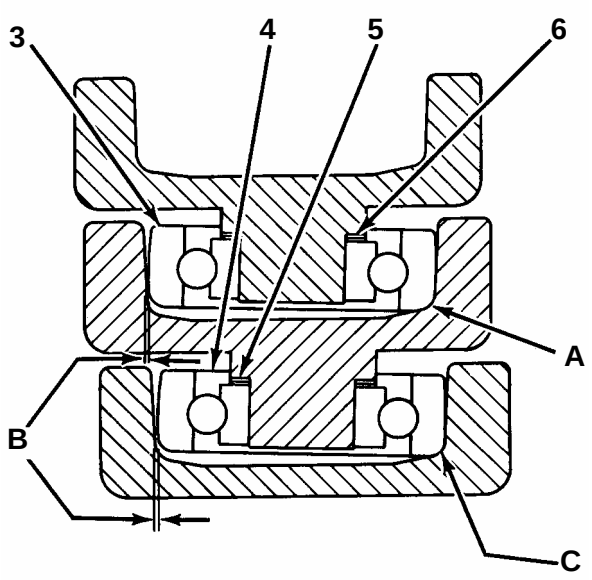
IDCS124S

Mast Adjustment Upper Bearings
(D) Zero clearance. (E) 0.80 mm (.031 in) Clearance maximum. (F) Zero clearance. (7) Pads. (8) Shims. (9) Shims. (10) Shims.



12. Install shims (8) behind each pad (7) until there is 0.80 mm (.031 in) maximum clearance (E) between the pads and the inner and intermediate masts with the masts at full extension. Lift by crane, and pull out intermediate mast from stationary mast and insert the shims behind each pad. In case of standard and full free mast, the pads of stationary upper can be easily extruded by pulling down the inner mast from the bottom of stationary mast.

D. Lower Bearing Adjustment of Inner Mast



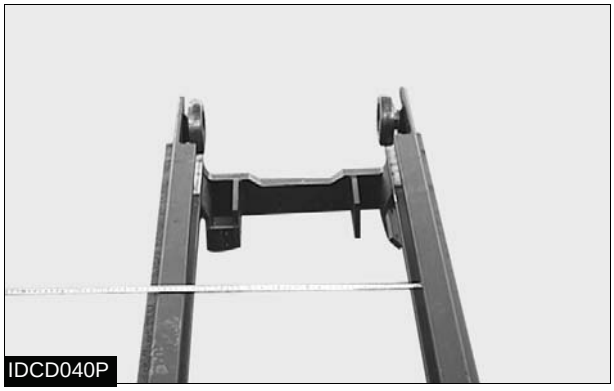
IDCS123S

Mast Adjustment Lower Bearings
(A) Zero clearance. (B)Minimum clearance. (C)Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

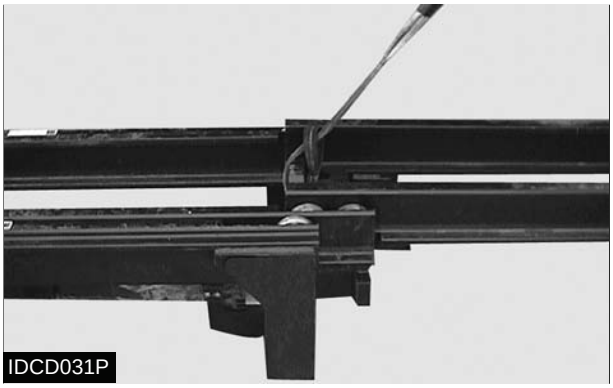
13. Select lower bearings (3) and (4) from the chart to obtain minimum clearance (B) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D. *
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.276 in)
D581816	Over Size	110.7 mm (4.358 in)

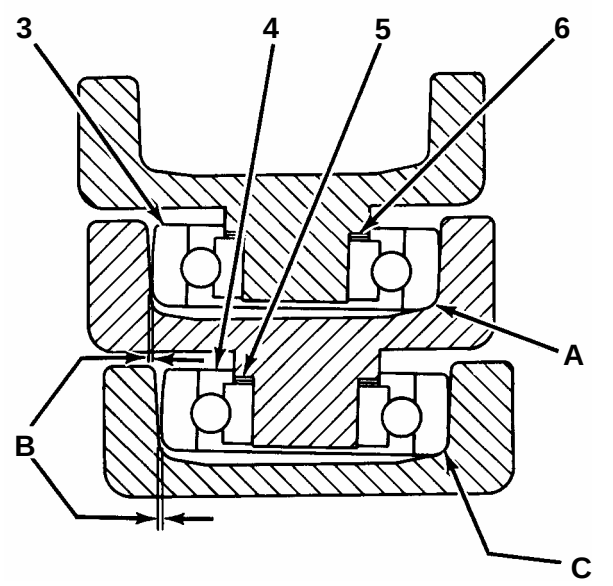
* Permissible tolerance ± 0.08mm (.003in)



14. Find narrowest point by ruler on the intermediate mast in the area where the inner lower bearings make contact full length of intermediate mast excluding minimum channel lap 475 mm (18.7 in).



15. Install 1 mm shim to each bearing of inner lower and intermediate upper basically. Lifting by crane, insert inner mast into intermediate mast from the upper side.



IDCS123S

Mast Adjustment Lower Bearings
(A) Zero clearance. (B) Minimum clearance. (C) Zero clearance.
(3) Bearing. (4) Bearing. (5) Shims. (6) Shims.

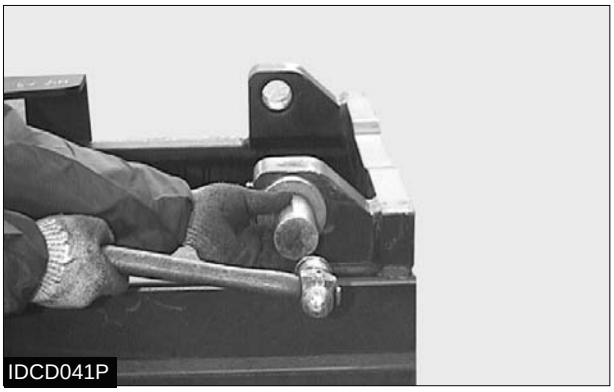
16. Make sure inner mast lower bearings are properly shimmed in the intermediate mast by rolling up and down and moving inner mast to right and left. If clearance between both masts can be detected, pull down the inner mast from the bottom of intermediate mast. Inner lower bearings can be easily extruded. Add shim 0.5 mm or 1 mm to both inner lower bearings. If inner mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the inner mast from the intermediate mast and remove shim 0.5 mm to both inner lower bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between inner lower bearings and intermediate channel at narrowest point.

E. Upper Bearing Adjustment of intermediate Mast

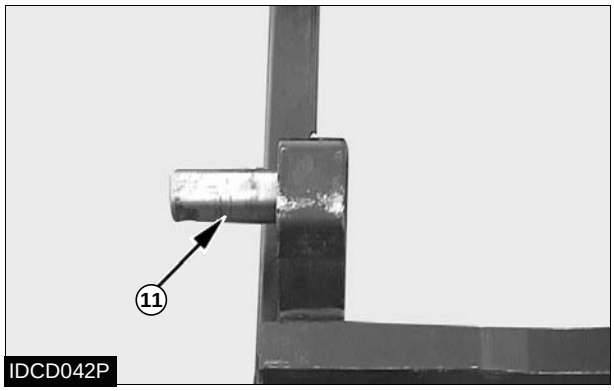
Follow same procedure with above B.

F. Upper Pad Adjustment of Intermediate Mast

Follow same procedure with above C.

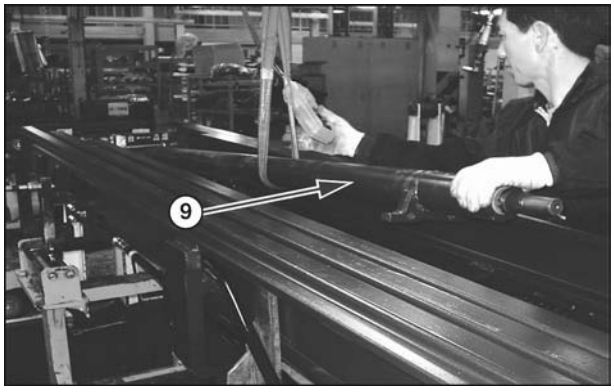


17. If the bearings were removed from the mast mounting blocks, install new ones.

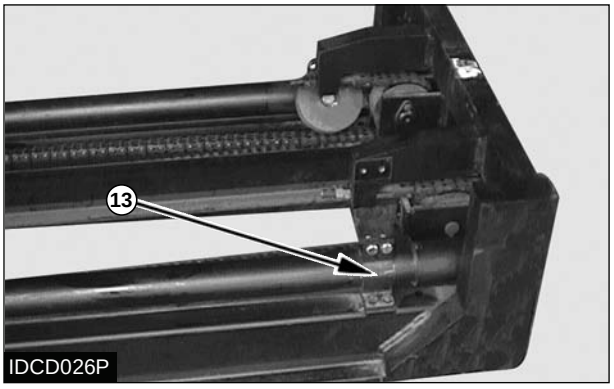


18. Put a small amount of clean grease on mounting pins (11). Install mounting pins (11) into mast mounting blocks.

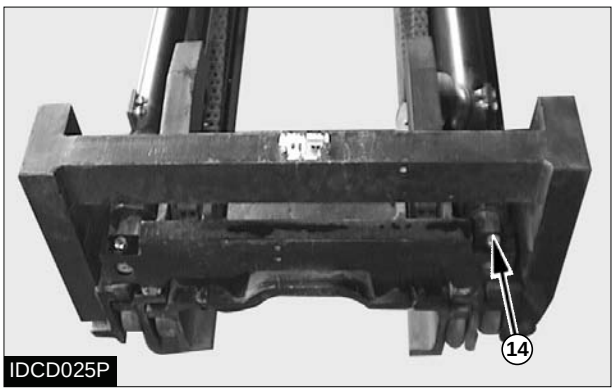
19. If the bearings were removed from the tilt cylinder pin bores, install new ones.



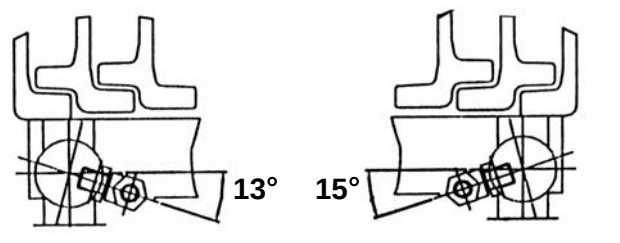
20. Fasten a hoist and nylon strap to secondary cylinder (12). Install secondary cylinders (12) into the stationary mast.



21. Install secondary cylinder mounting brackets (13) over the secondary cylinders.

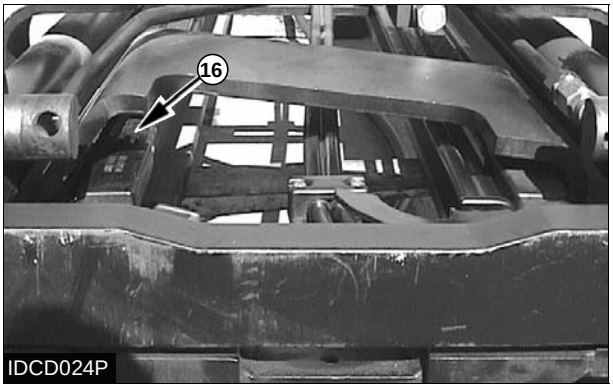


22. Install top retainer bolts (14) for the secondary cylinders.

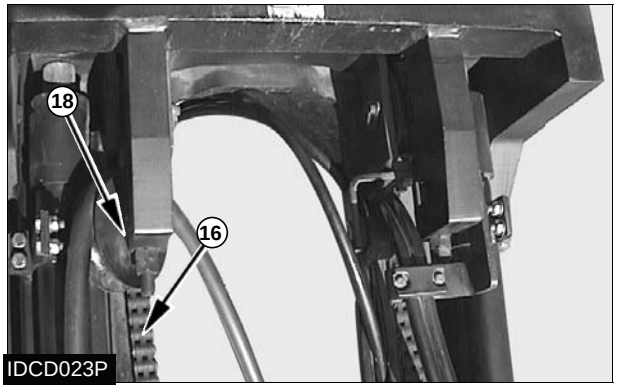


IDCS322S

23. Install hydraulic steel tube to each secondary cylinder. When install the steel tube, assembling angle should be kept as shown in above figure.

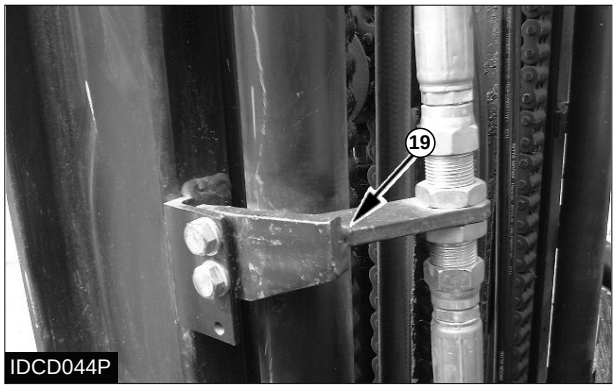


24. Connect chains (16) at the bottom of the mast.

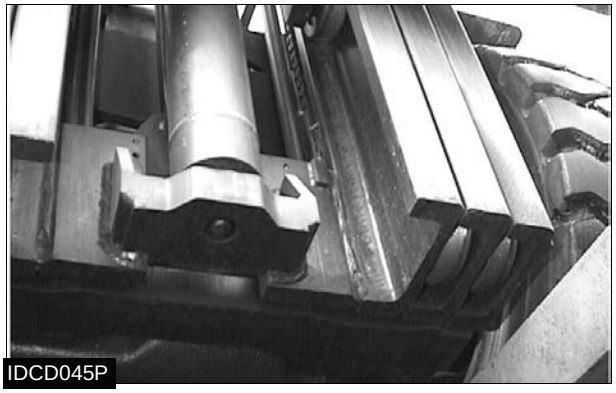


25. Connect chains (16) at the chain bracket of stationary mast upper.

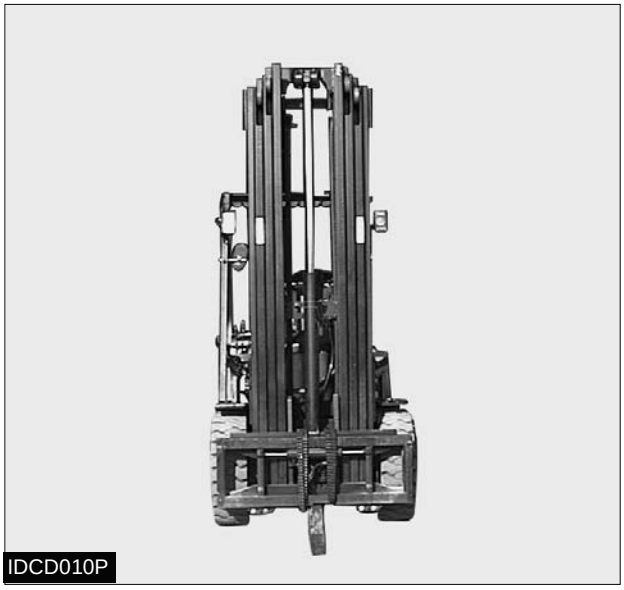
26. Install sheave (18) of lift hose.



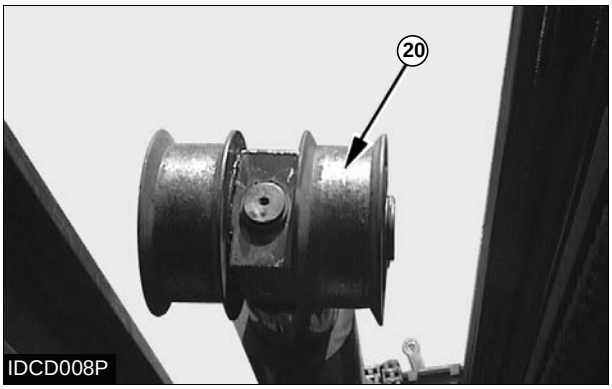
27. Install the lift hose support bracket (19) and hoses.



28. Install primary lift cylinder.

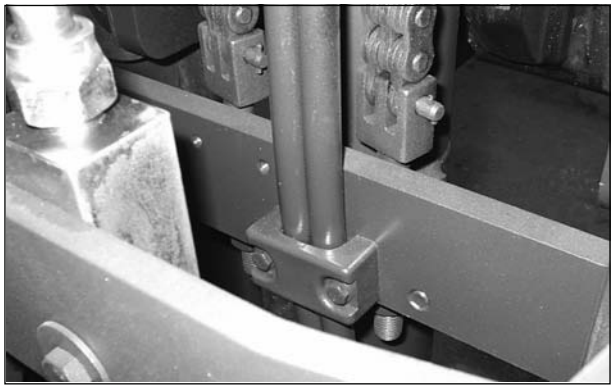


29. Install carriage assembly from the bottom of inner mast

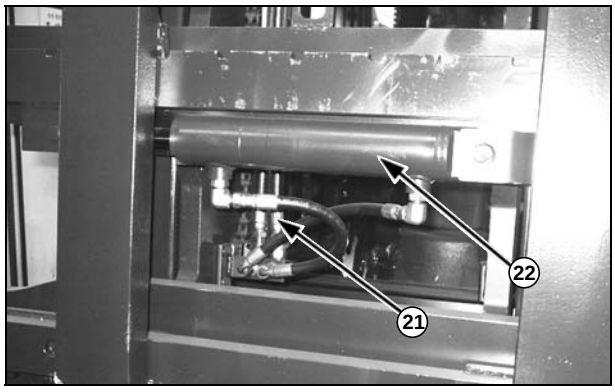


30. Install cross head (20) to primary lift cylinder.

33. Install mast to lift truck.



31. Install carriage chains to primary lift cylinder.



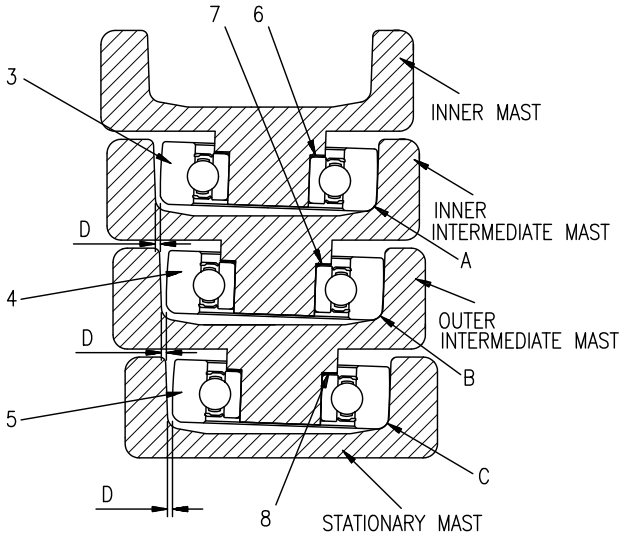
32. Install hydraulic hose (21) of side shifter to side shifter cylinder (22).

Assemble Quad Mast

1. Make sure all parts are clean and free of dirt and foreign material.

2. Check all parts for damage, use new parts for replacement.

A. Lower Bearing Adjustment of Outer Intermediate Mast

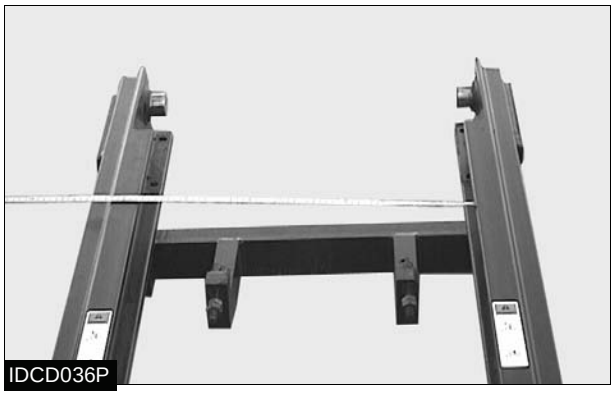


Mast Adjustment Lower Bearings
(A, B, C) Zero clearance. (D) Minimum clearance.
(3, 4, 5) Bearing (6, 7, 8) Shims.

3. Select lower bearings (3), (4) and (5) from the chart to obtain minimum clearance (D) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D. *
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.276 in)
D581816	Over Size	110.7 mm (4.358 in)

* Permissible tolerance ± 0.08 mm (.003 in)



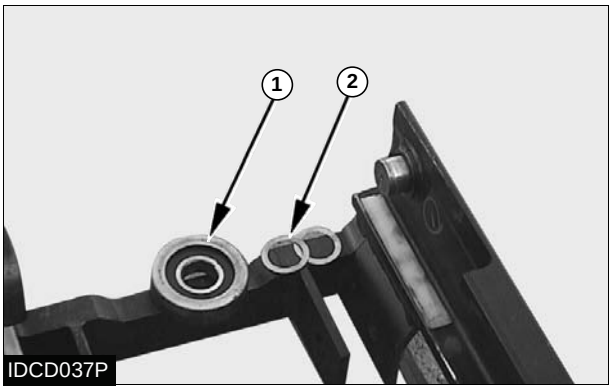
4. Find narrowest point by ruler on the staionary mast in the area where the bearings make contact at 475 mm (18.7 in) channel lap.

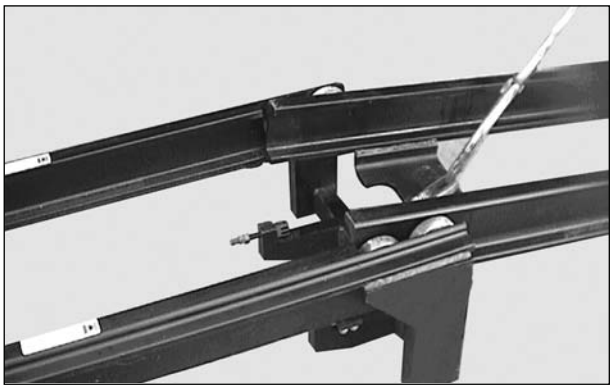
NOTE: When installing shims (2) behind bearings (1), make sure the amount of shim is divided equally when positioned behind each bearing (1).

5. Install the correct amount of shim (2) behind rollers until contact (zero clearance) is made between the rollers.

NOTICE

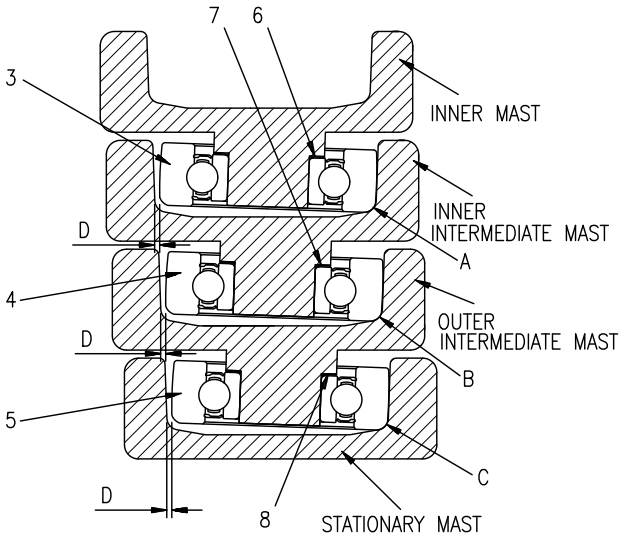
When the correct amount of shim has been installed behind rollers (1) there will be contact (zero clearance) between the rollers and the inner mast at most narrow point of mast (refer to step 4)



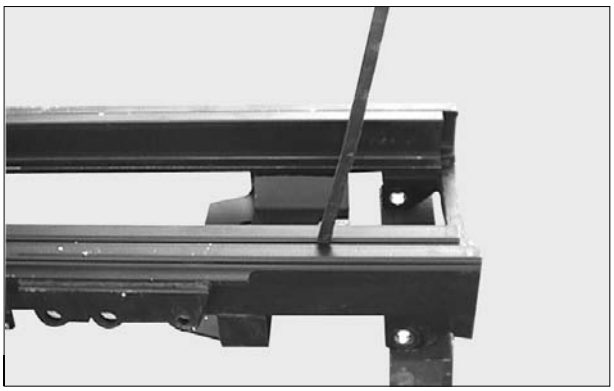


6. Install 1 mm shim to each bearing of intermediate lower and stationary upper basically. Lifting by crane, insert intermediate mast into stationary mast from the upper side.

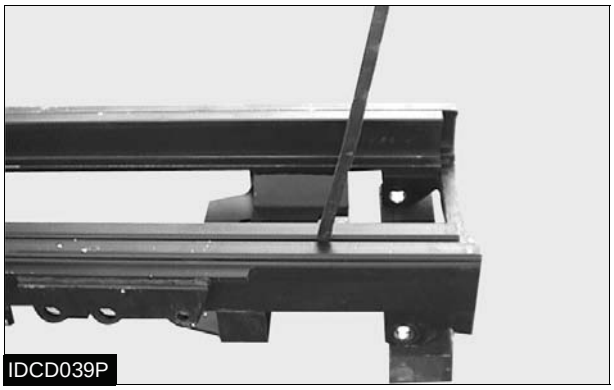
NOTE: When installing shims (5) behind bearings (4), make sure the amount of shim is divided equally when positioned behind each bearing (4).



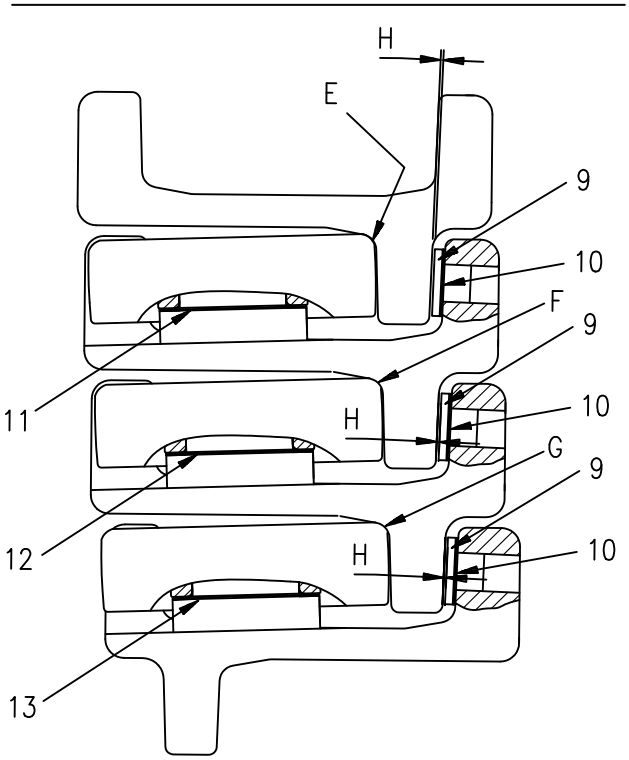
Mast Adjustment Lower Bearings
(A, B, C) Zero clearance. (D) Minimum clearance.
(3, 4, 5) Bearing (6, 7, 8) Shims.



7. Make sure outer intermediate mast lower bearings are properly shimmed in the stationary mast by rolling up and down and moving outer intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both intermediate lower bearings.

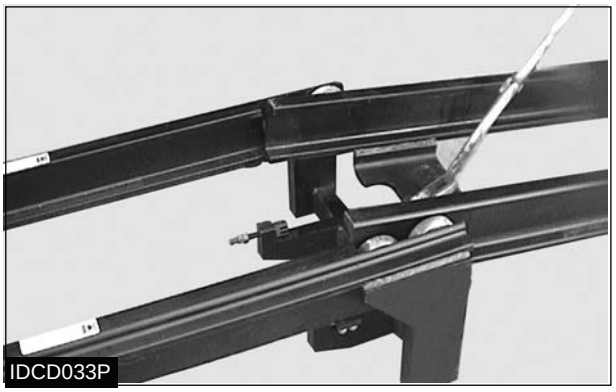


8. If intermediate mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the outer intermediate mast from the stationary mast and remove shim 0.5 mm to both outer intermediate lower bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between intermediate lower bearings and stationary channel at approximately 475 mm (18.7 in) channel lap.

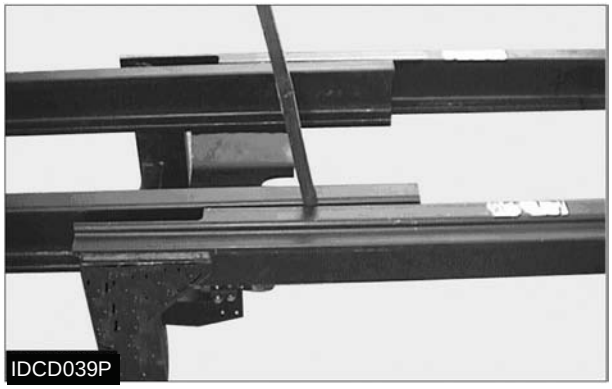


Mast Adjustment Upper Bearings
(E, F, G) Zero clearance. (H) 0.80 mm (.031 in) Clearance maximum. (9) Pads. (10) Shims. (11, 12, 13) Shims.

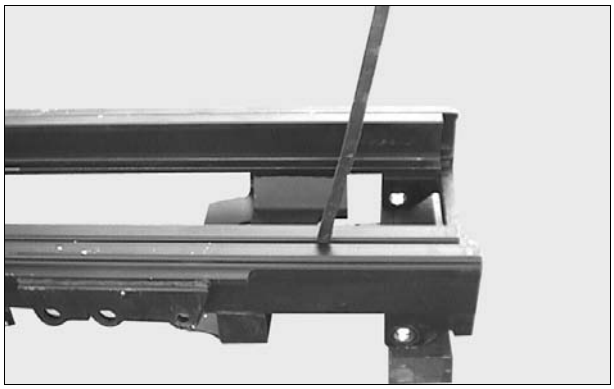
B. Upper Bearing Adjustment of Stationary Mast



9. Lift by crane, and pull out intermediate mast from stationary mast. Install 1 mm shim to each bearing of stationary mast upper basically. Bearing should be selected D581814 under size bearing.

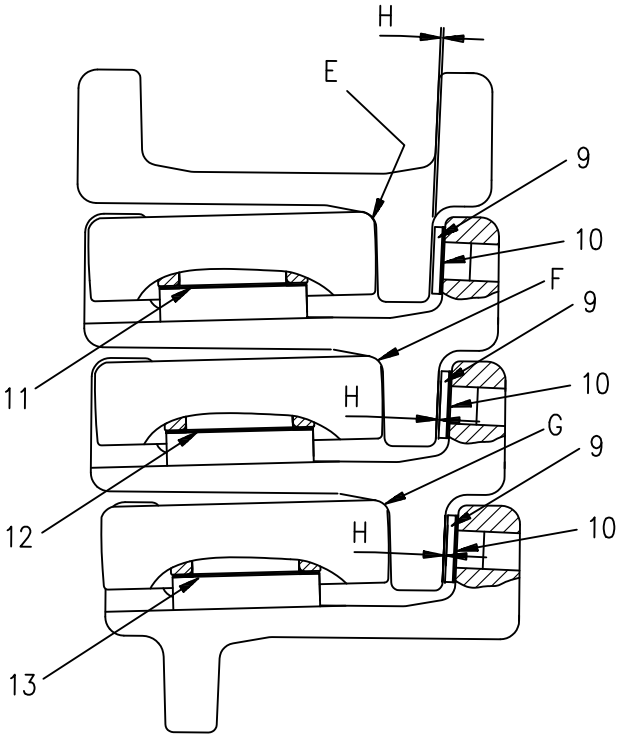


10. Make sure stationary mast upper bearings are properly shimmed by rolling up and down and moving intermediate mast to right and left. If clearance between both masts can be detected, pull out the intermediate mast from the stationary mast with crane and add shim 0.5 mm or 1 mm to both stationary upper bearings.

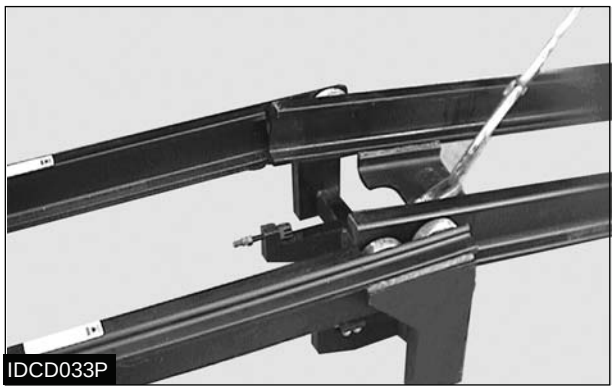


11. If outer intermediate mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the outer intermediate mast from the stationary mast and remove shim 0.5 mm to both stationary upper bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (G) between stationary upper bearings and the widest point of intermediate mast to be checked before.

C. Upper Pad Adjustment



Mast Adjustment Upper Bearings
(E, F, G) Zero clearance. (H) 0.80 mm (.031 in) Clearance maximum. (9) Pads. (10) Shims. (11, 12, 13) Shims.

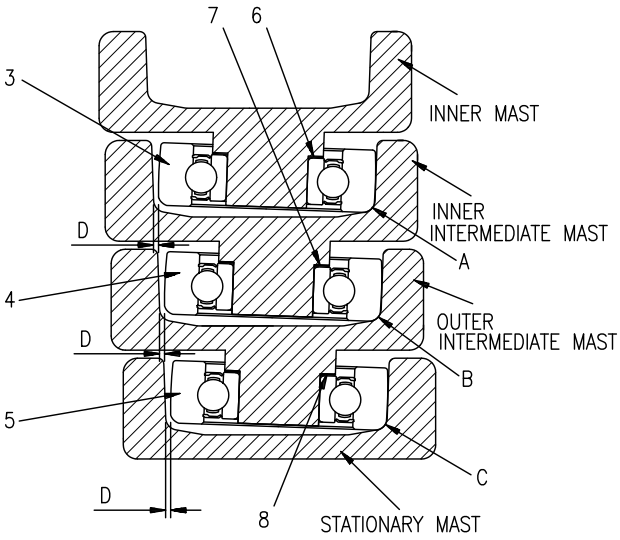


12. Install shims (10) behind each pad (9) until there is 0.80 mm (.031 in) maximum clearance (H) between the pads and the inner and intermediate masts with the masts at full extension. Lift by crane, and pull out intermediate mast from stationary mast and insert the shims behind each pad. In case of standard and full free mast, the pads of stationary upper can be easily extruded by pulling down the inner mast from the bottom of stationary mast.

D. Inner Intermediate Mast Adjustment.

Follow same procedure with above A~C.

E. Lower Bearing Adjustment of Inner Mast



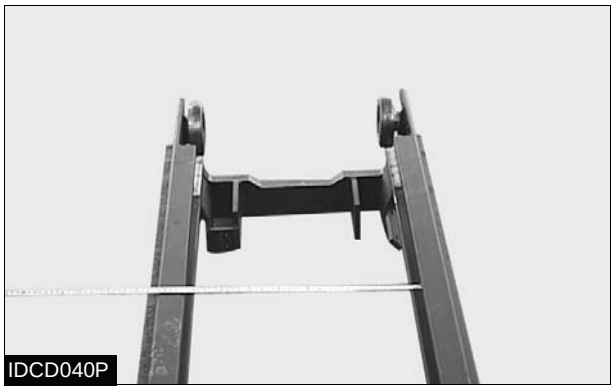
Mast Adjustment Lower Bearings
(A, B, C) Zero clearance. (D) Minimum clearance.

(3, 4, 5) Bearing (6, 7, 8) Shims.

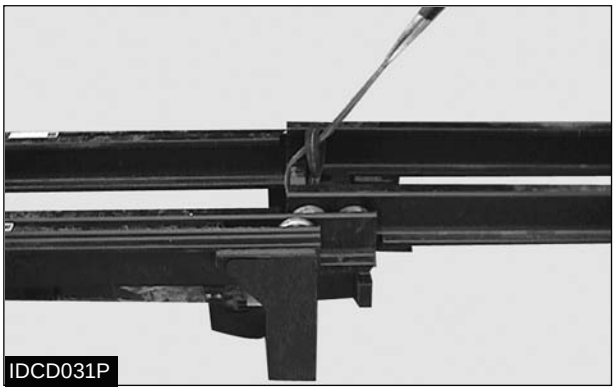
13. Select lower bearings (3) and (4) from the chart to obtain minimum clearance (B) between bearing and channel leg for full channel length. Must use same bearing on left and right side.

Mast And Carriage Bearings		
Part No.	Bearing Size	Bearing O.D. *
D581814	Under Size	108.6 mm (4.276 in)
D581815	Standard	109.6 mm (4.276 in)
D581816	Over Size	110.7 mm (4.358 in)

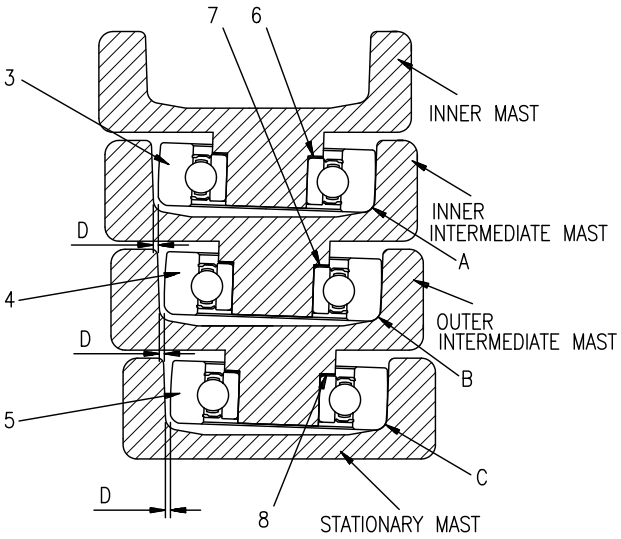
* Permissible tolerance ± 0.08mm (.003in)



14. Find narrowest point by ruler on the inner intermediate mast in the area where the inner lower bearings make contact full length of inner intermediate mast excluding minimum channel lap 475 mm (18.7 in).



15. Install 1 mm shim to each bearing of inner lower and inner intermediate upper basically. Lifting by crane, insert inner mast into intermediate mast from the upper side.



Mast Adjustment Lower Bearings
(A, B, C) Zero clearance. (D) Minimum clearance.
(3, 4, 5) Bearing (6, 7, 8) Shims.

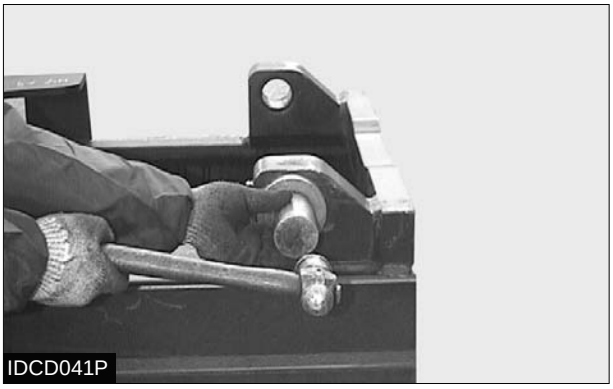
16. Make sure inner mast lower bearings are properly shimmed in the intermediate mast by rolling up and down and moving inner mast to right and left. If clearance between both masts can be detected, pull down the inner mast from the bottom of intermediate mast. Inner lower bearings can be easily extruded. Add shim 0.5 mm or 1 mm to both inner lower bearings. If inner mast is stuck and cannot move by rolling up and down, there might be excessive shim. Pull out the inner mast from the inner intermediate mast and remove shim 0.5 mm to both inner lower bearings. Repeat same procedure of above until properly shimmed. There is to be contact zero clearance (C) between inner lower bearings and inner intermediate channel at narrowest point.

F. Upper Bearing Adjustment of Inner Intermediate Mast

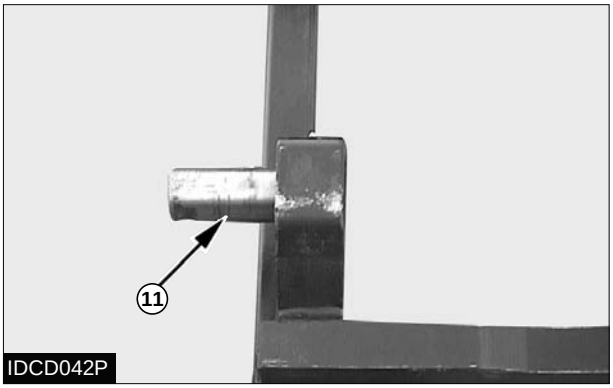
Follow same procedure with above B.

G. Upper Pad Adjustment of Inner Intermediate Mast

Follow same procedure with above C.

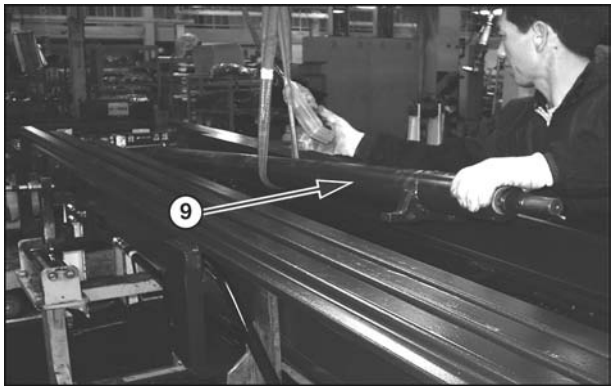


17. If the bearings were removed from the mast mounting blocks, install new ones.

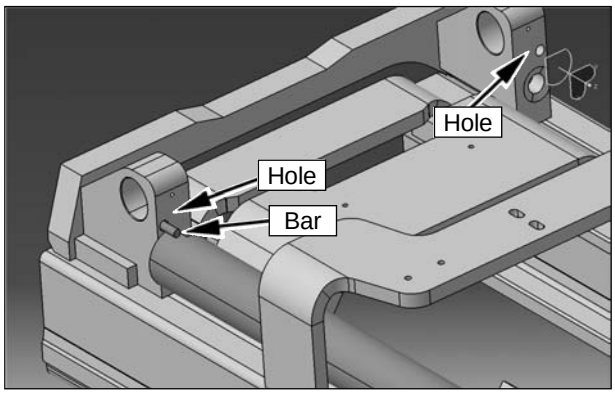


18. Put a small amount of clean grease on mounting pins (11). Install mounting pins (11) into mast mounting blocks.

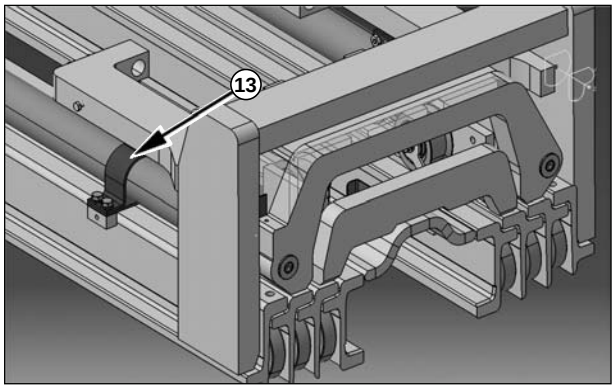
19. If the bearings were removed from the tilt cylinder pin bores, install new ones.



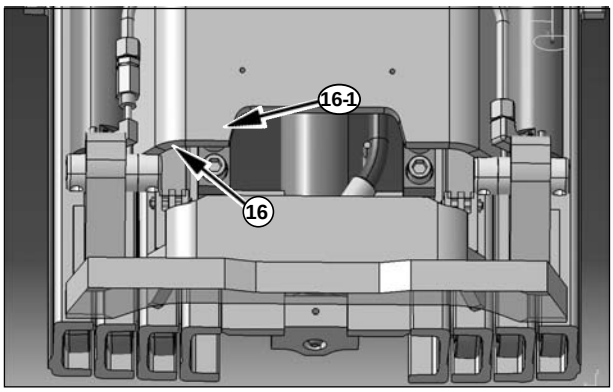
20. Fasten a hoist and nylon strap to secondary cylinder (12). Install secondary cylinders (12) into the stationary mast.



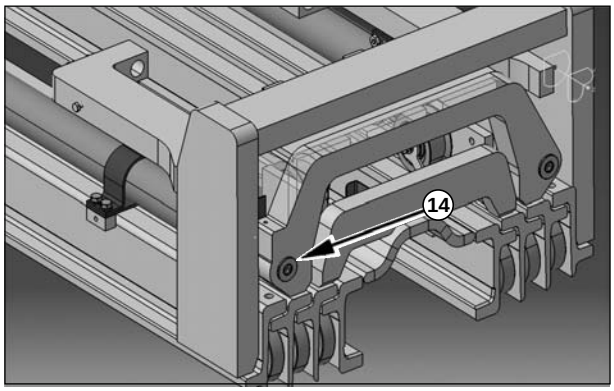
23. Put the end bar of cylinder into the hole of stationary mast's lower stay, then the angles of part become spontaneously 45°.



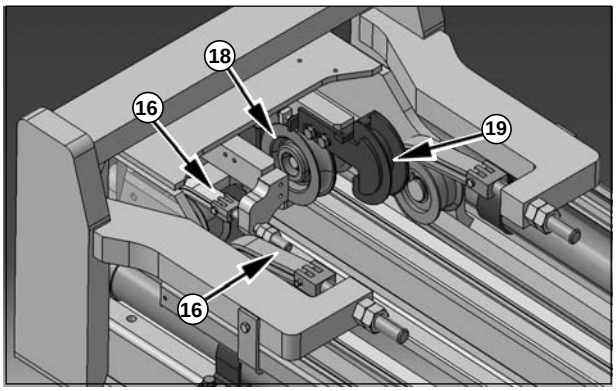
21. Install secondary cylinder mounting brackets (13) over the secondary cylinders.



24. Connect chains (16) and anchor block (16-1) at the bottom of the mast.

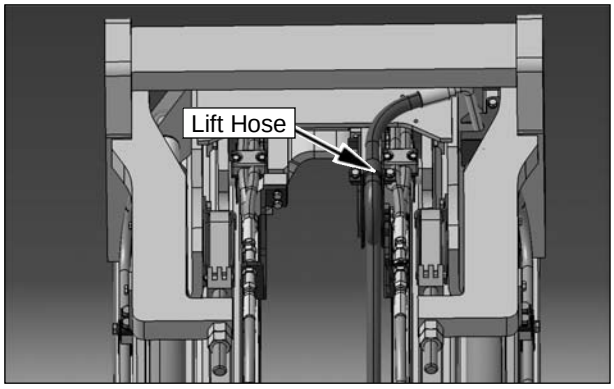


22. Install top retainer bolts (14) for the secondary cylinders.

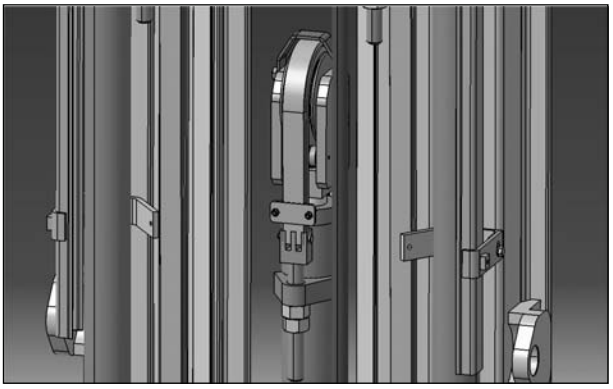


25. Connect chains (16) at the chain bracket of stationary mast upper.

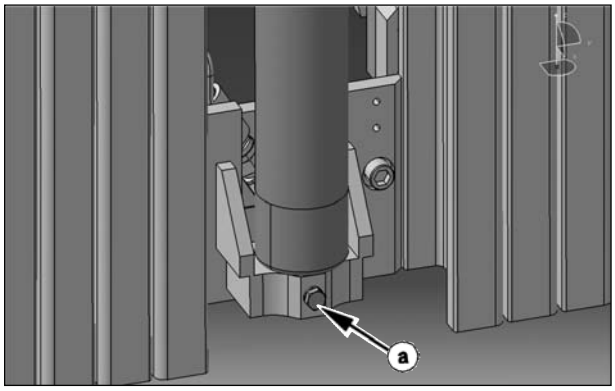
26. Install sheave (18) of lift hose.



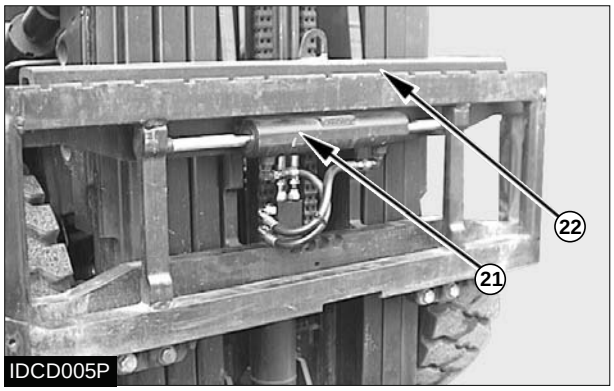
27. Install the lift hose along with the hose support clamps.



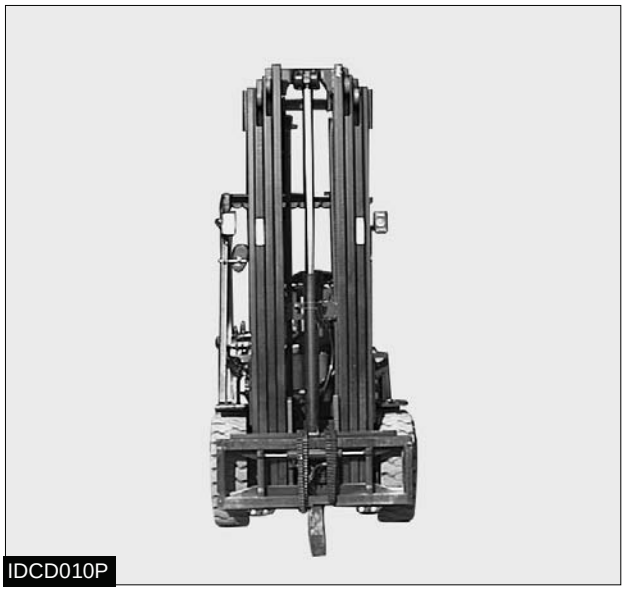
30. Install carriage chains to primary lift cylinder.



28. Install primary lift cylinder and assemble bolt (a).



31. Install hydraulic hose (21) of side shifter to side shifter cylinder (22).



29. Install carriage assembly from the bottom of inner mast

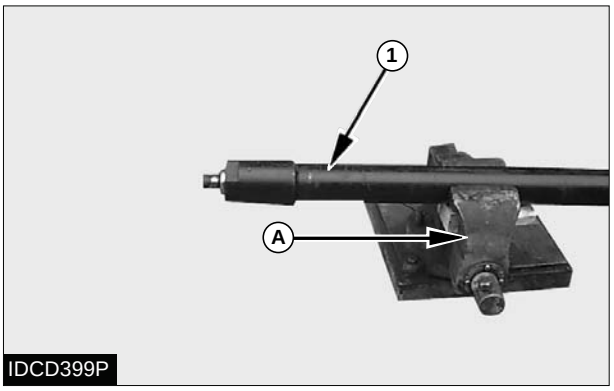
32. Install mast to lift truck.

Standard Lift Cylinder

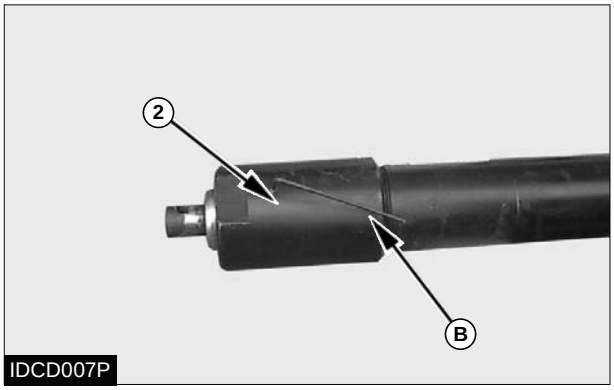
Disassemble Standard Lift Cylinder

Start By:

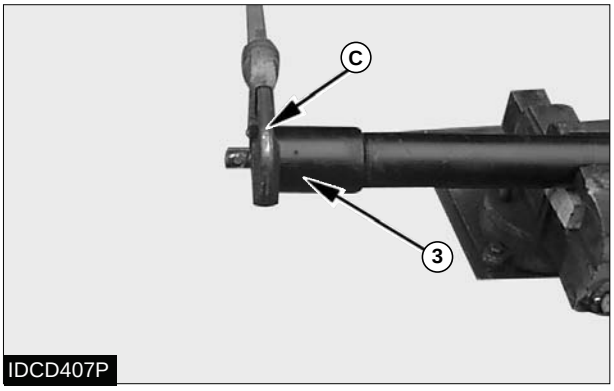
a. Remove standard lift cylinders.



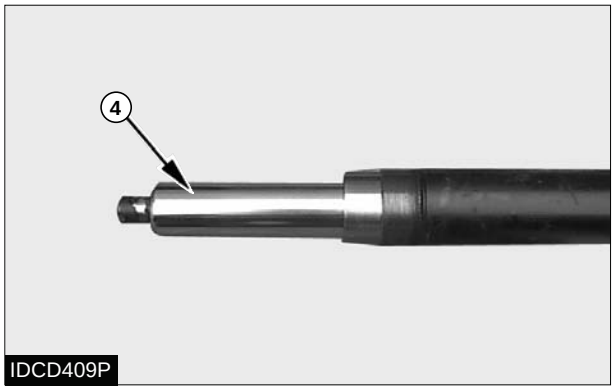
1. Put standard lift cylinder (1) in position on vise (A).



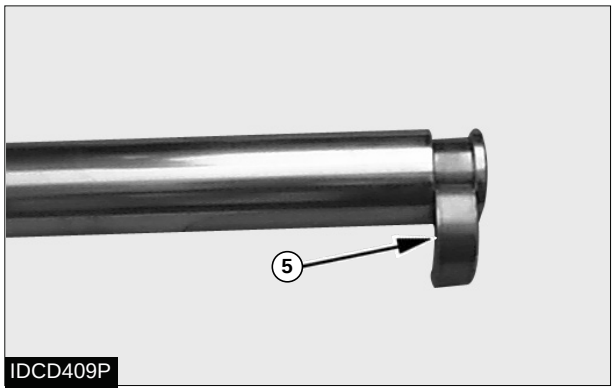
2. Loosen set screw (2) with wrench (B).



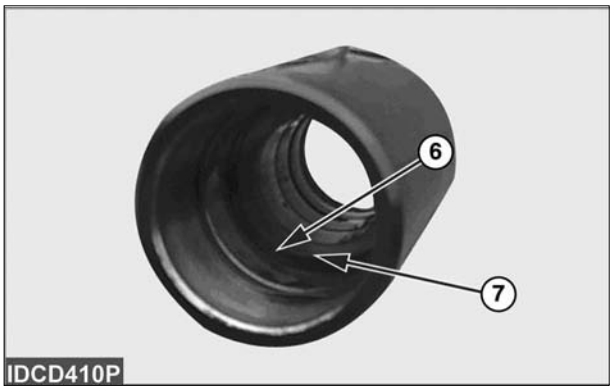
3. Remove bearing (3) with wrench (C).



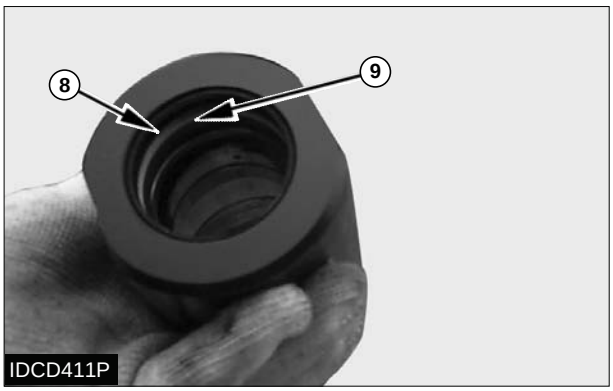
4. Remove rod (4) from the cylinder body.



5. Remove split rings (5) from the cylinder rod.

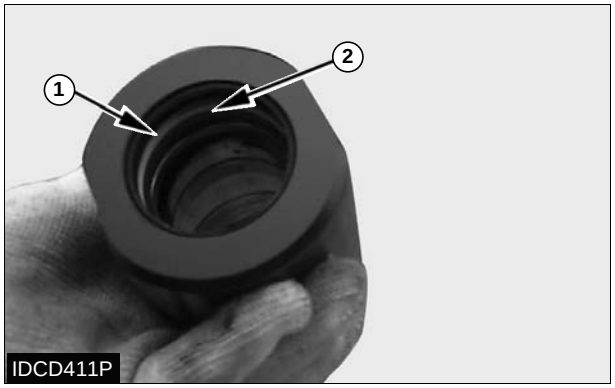


6. Remove O-ring seal (6) and back-up ring (7) from the bearing.



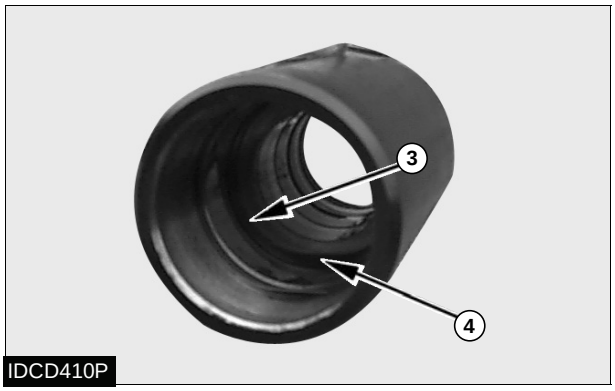
7. Remove wiper seal (8) and seal (9) from the bearing.

Assemble Standard Lift Cylinder



1. Install seal (2) in the bearing.

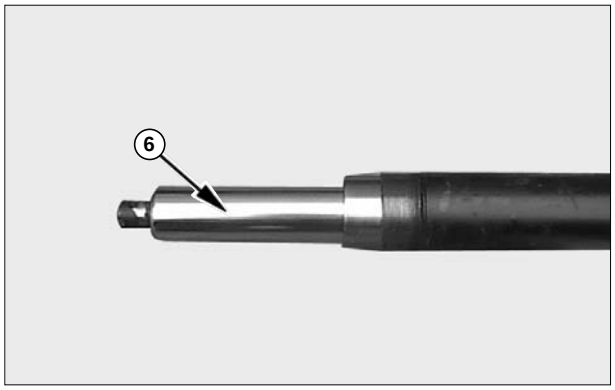
2. Install wiper seal (1). Install the seal with the lip toward the outside.



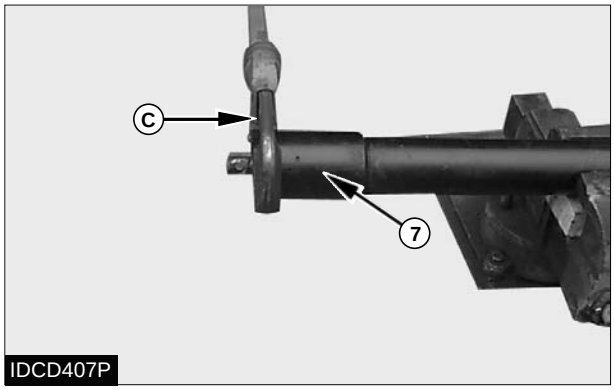
NOTE : Install back-up ring (4) with the curved side contacting the O-ring seal.

3. Install O-ring seal (3) and back up ring (4) into the bearing.

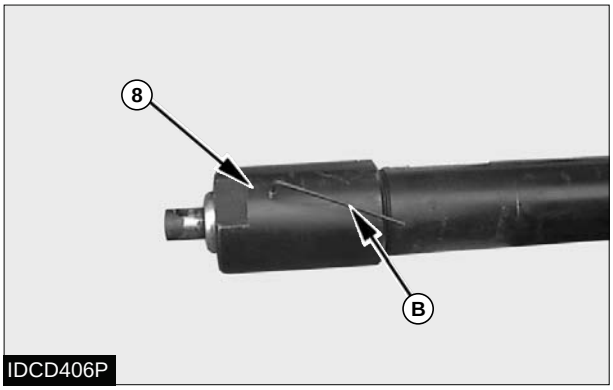
4. Install split rings (5) on the cylinder rod.



5. Install cylinder rod (6) in the cylinder body.



6. Install bearing (7) on the cylinder rod and tighten using wrench (C).



7. Tighten setscrew (8) with wrench (B) to a torque of 6±1 N·m (53±9 lb·in).

End By:

a. Install standard lift cylinders.

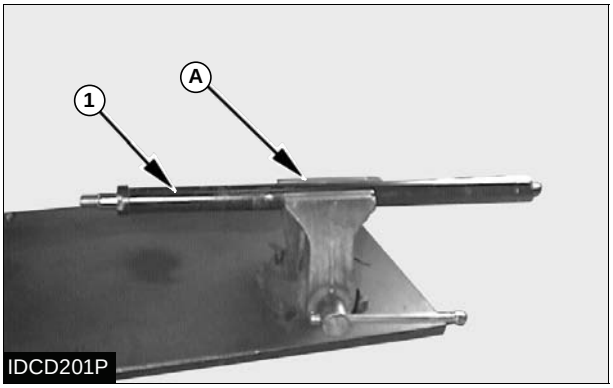
Secondary Lift Cylinder

Disassemble Secondary Lift Cylinder

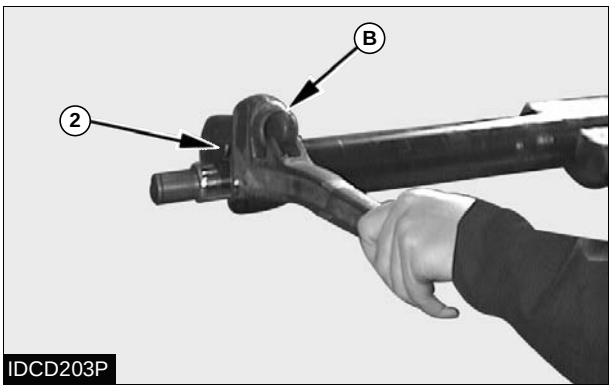
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1

Start By:

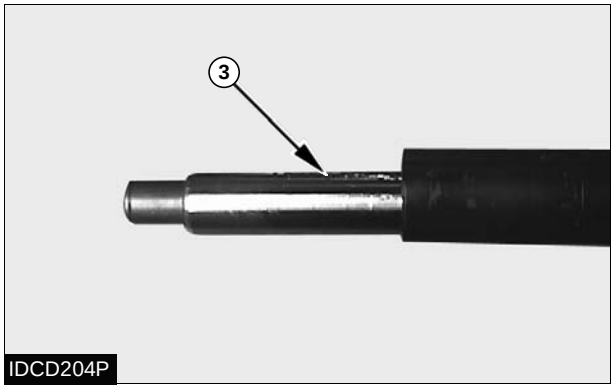
a. Remove standard lift cylinders.



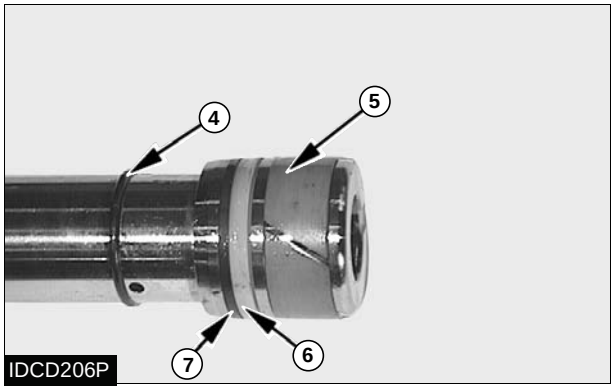
1. Put standard lift cylinder (1) in position on tool (A).



2. Remove bearing (2) with tool (B).

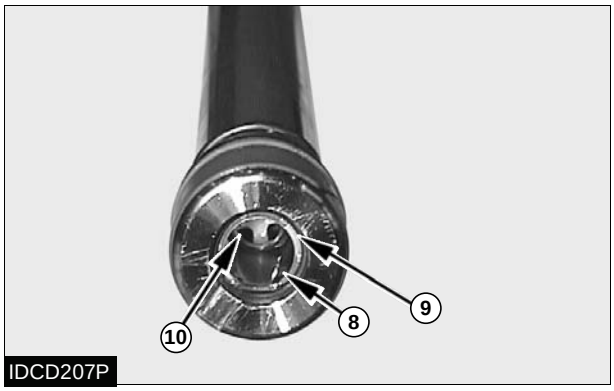


3. Remove rod (3) from the cylinder body.



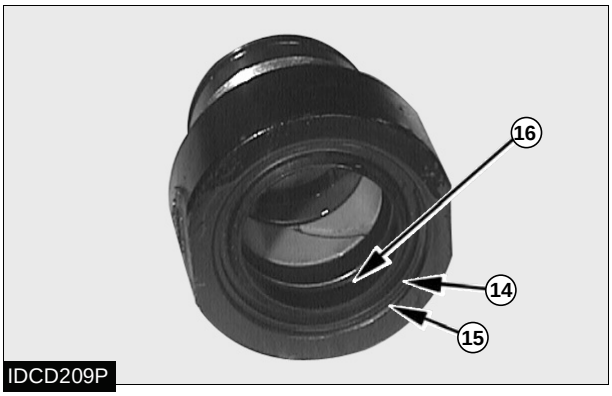
4. Remove stop ring (4) from the cylinder rod.

5. Remove wear ring(5), U-packing(6) and backup ring(7).



6. Remove retaining ring(8), spacer(9) and check valve(10).

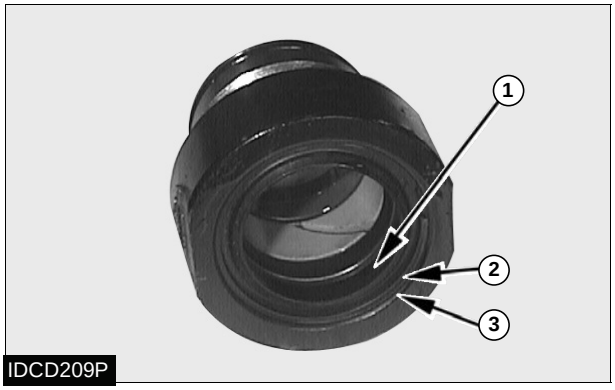
7. Remove ring (11), wear ring (12) and O-ring (13) from the bearing.



8. Remove wiper seal (14) and retaining ring (15) from the bearing.

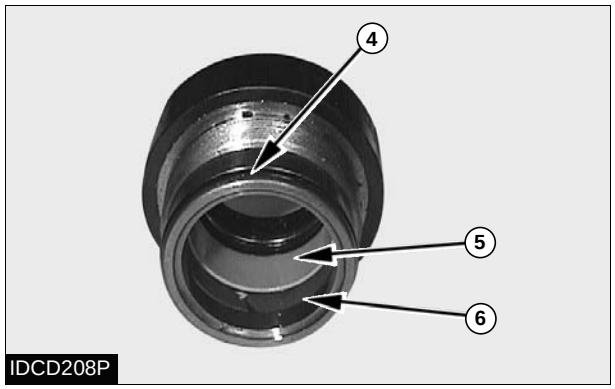
9. Remove U-packing (16).

Assemble Secondary Lift Cylinder

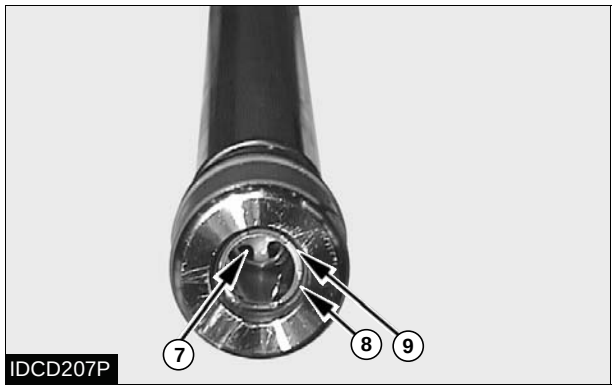


1. Install U-packing (1) in the bearing.

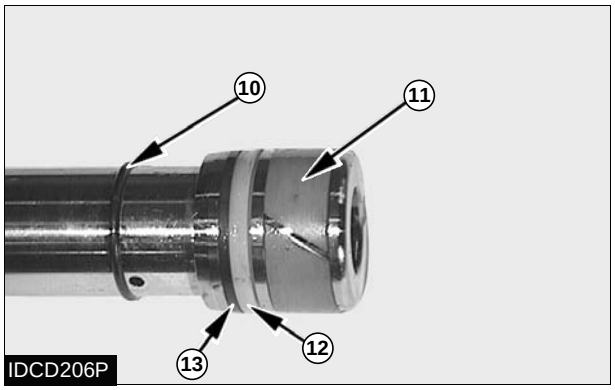
2. Install wiper seal (2) and retaining ring (3). Install the seal with the lip toward the outside.



3. Install O-ring (4), wear ring (5) and ring (6) in the bearing.

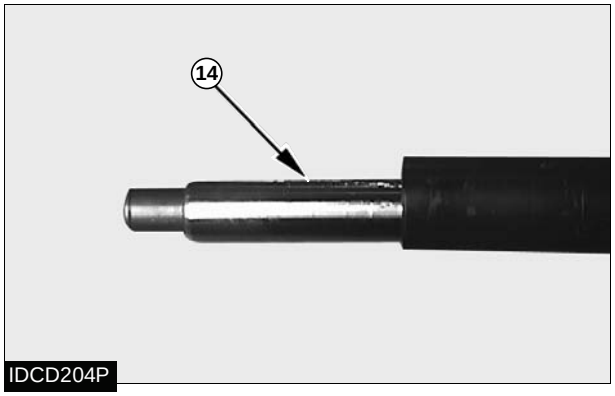


4. Install check valve (7), retaining ring (8) and spacer (9).

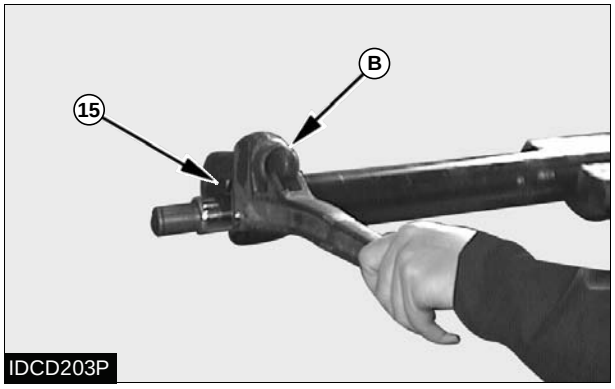


5. Install stop rings (10) on the cylinder rod.

6. Install wear ring (11), U-packing (12) and backup ring (13).



7. Install cylinder rod (14) in the cylinder body.



8. Install bearing (15) on the cylinder rod and tighten using tool (B).

End By :

a. Install secondary lift cylinders.

Primary Lift Cylinder

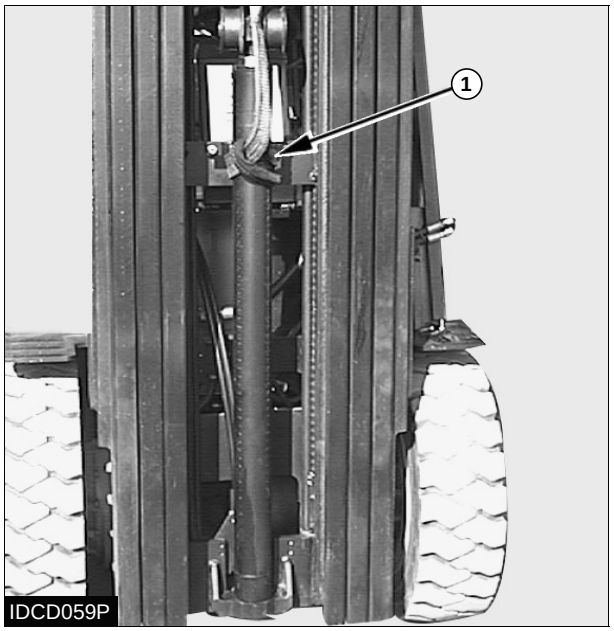
Remove & Install Primary Lift Cylinder

Start By:

a. Remove carriage.

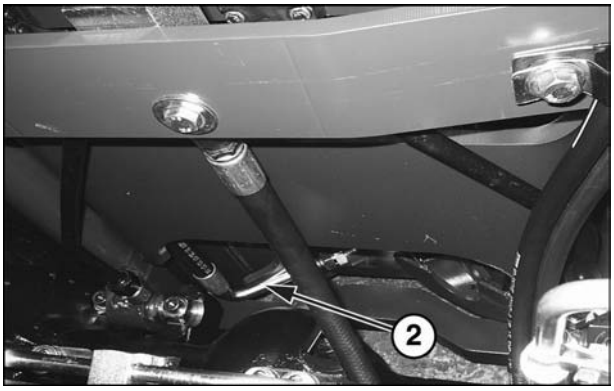
⚠ WARNING

To prevent personal injury, move the control levers backward and forward to release any pressure in hydraulic system. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.



1. Fasten nylon straps and hoist to the primary lift cylinder.

2. Remove bolts (1).



3. Pull the cylinder out far enough to disconnect elbow (2). Remove primary lift cylinder. Weight is roughly 27 kg (60 lb).

NOTE : The following steps are for the installation of the primary lift cylinder.

4. Put primary lift cylinder (3) in position on the mast.

5. Connect elbow (2).

6. Install bolt bolts (1).

End By:

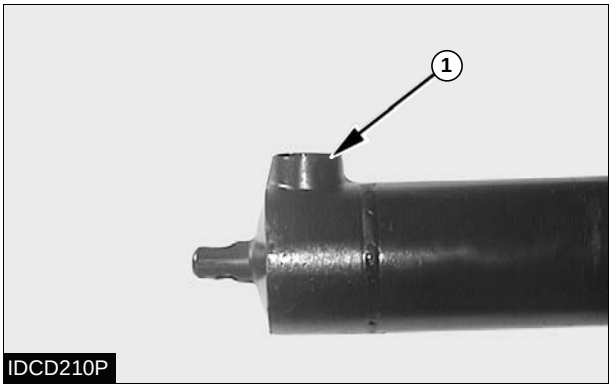
a. Install carriage.

Disassemble Primary Lift Cylinder

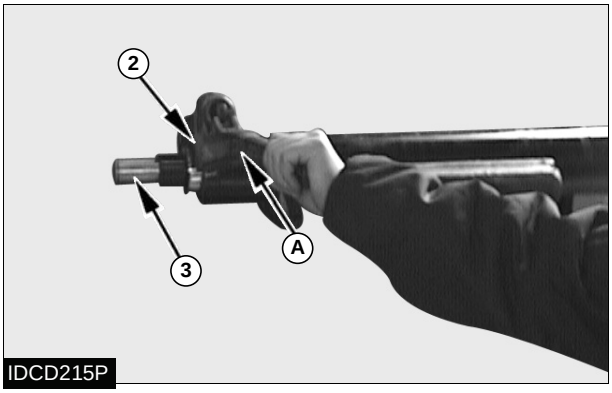
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1

Start By:

a. Remove primary lift cylinder.

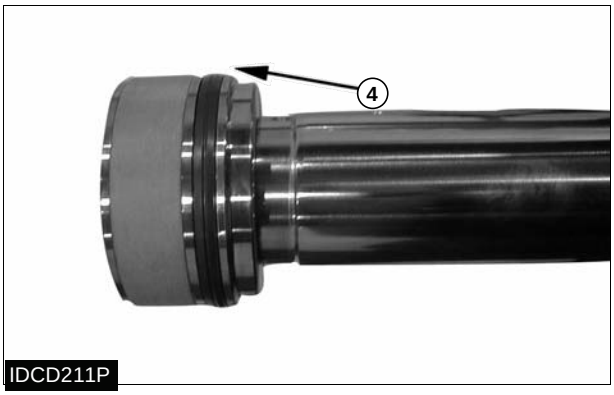


1. Remove flow protector valve (1) from the cylinder body.

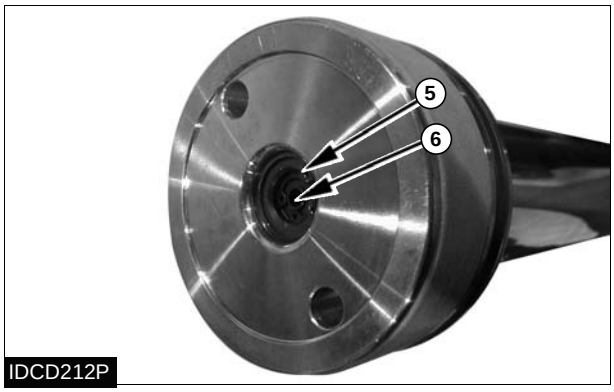


2. Remove rod cover (2) with tool (A).

3. Remove rod (3) from the cylinder body.

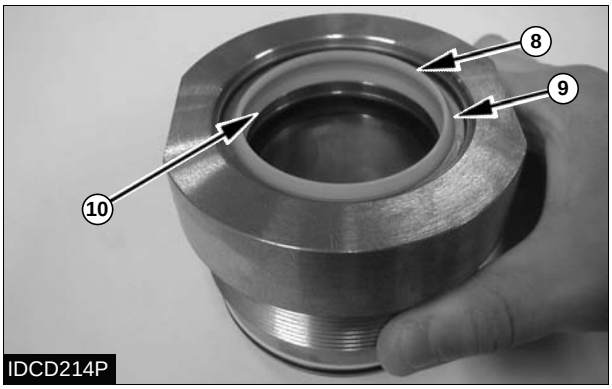


4. Remove piston seal (4).



5. Remove retaining ring (5), and check valve (6).

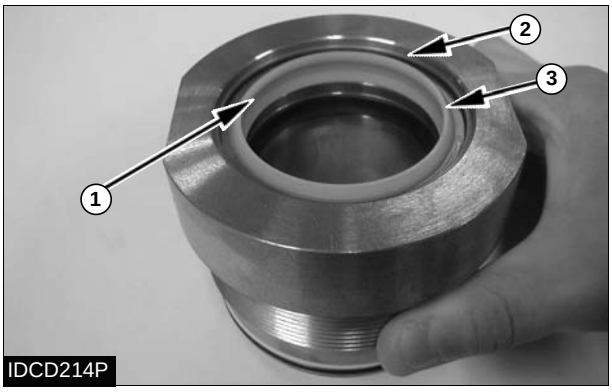
6. Remove O-ring (7).



7. Remove wiper seal (8) and retaining ring (9) and U-packing (10) from the rod cover.

Assemble Primary Lift Cylinder

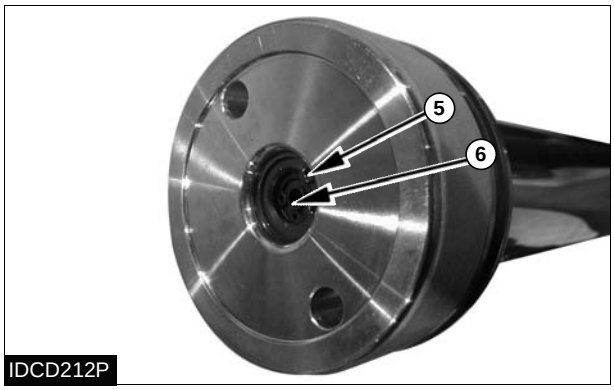
Tools Needed	A	B
Hydraulic Cylinder Repair Stand	1	
Wrench Assembly		1



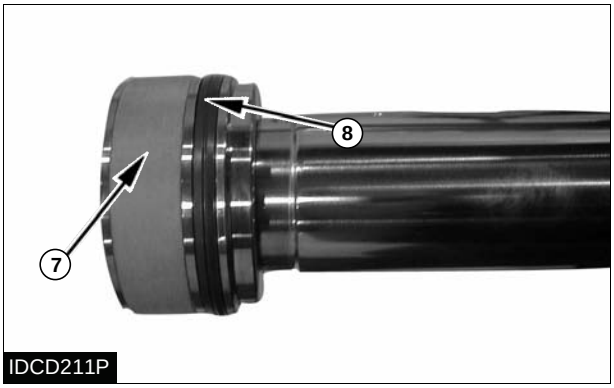
1. Install U-packing (1) in the rod cover.

2. Install wiper seal (2) and retaining ring (3). Install the seal with the lip toward the outside.

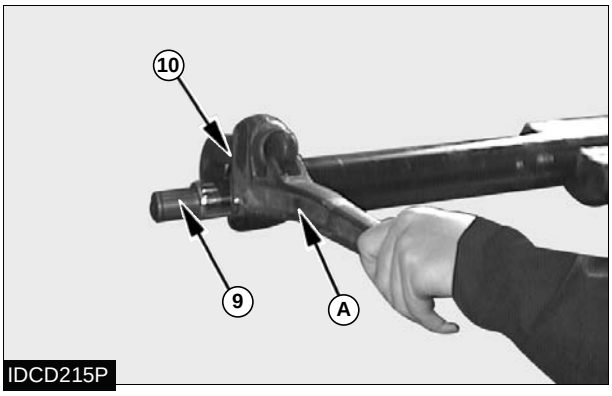
3. Install O-ring seal (4).



4. Install check valve (5), retaining ring (6).

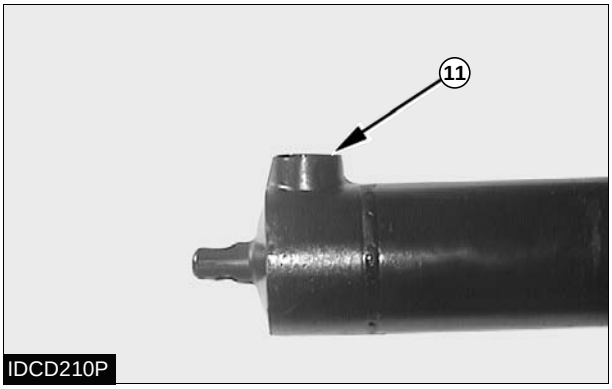


5. Install wear ring (7), piston seal (8) on the cylinder rod.



6. Install cylinder rod (9) in the cylinder body.

7. Install rod cover (10) on the cylinder body. Use tool (A) to tighten bearing.



8. Install flow protector valve (11) on the cylinder body.

End By:

a. Install primary lift cylinder.

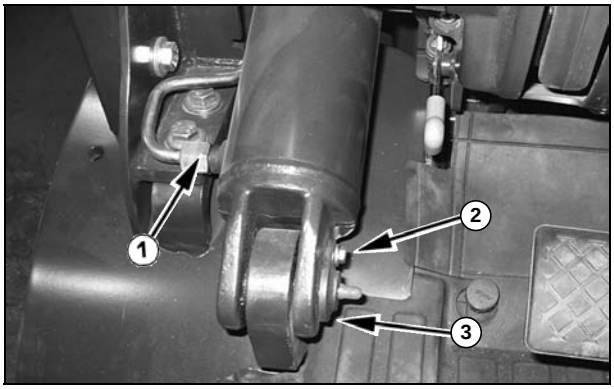
Tilt Cylinder

Remove & Install Tilt Cylinders

NOTE: The procedure for removing and installing the tilt cylinders is the same for both cylinders.

⚠ WARNING

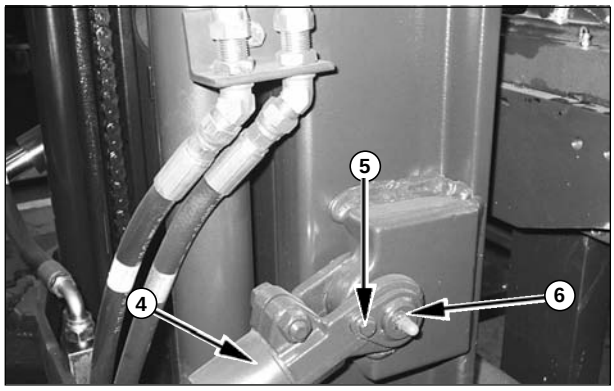
If both tilt cylinders are removed at the same time the mast can fall. To avoid possible personal injury, make sure the mast is securely held in place or supported by a hoist before removing the tilt cylinders.



⚠ WARNING

To prevent personal injury, move the control levers backward and forward to release any pressure in hydraulic system. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

1. Disconnect the connector (1). Remove retainer bolt (2) and pin (3).



2. Remove retainer bolt (6) from pin (5). Remove pin (6).

3. Remove tilt cylinder (4).

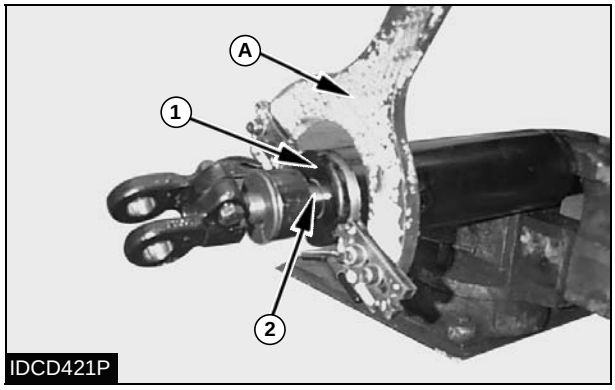
4. Install the tilt cylinder in the reverse order of removal.

Disassemble & Assemble Tilt Cylinders

Tools Needed	A
Spanner Wrench	1

Start By:

a. Remove tilt cylinder.

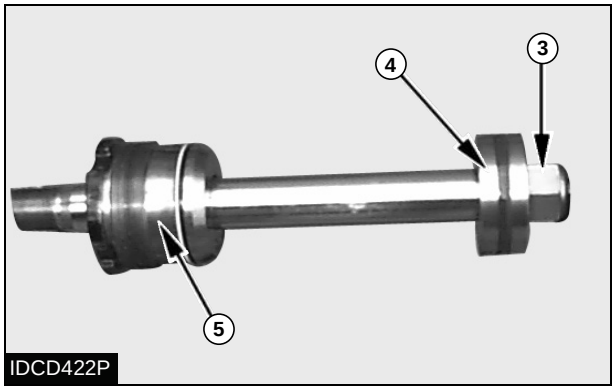


1. Use tool (A) to remove head (1) from the cylinder body.

NOTICE

Use extra care not to damage the highly finished surface of the cylinder rod and the bore of the cylinder body during disassembly and assembly of the tilt cylinder.

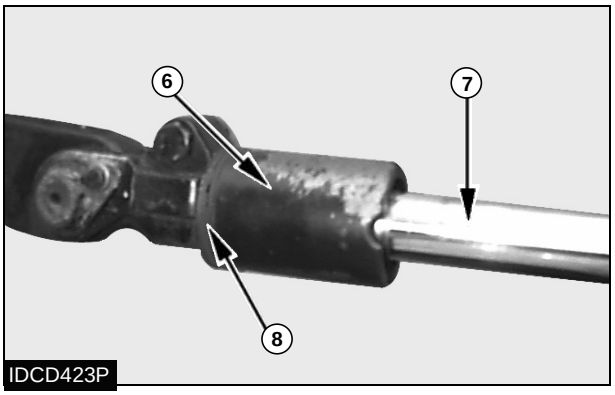
2. Remove rod assembly (2) from the cylinder body.



3. Remove nut (3) from the cylinder rod.

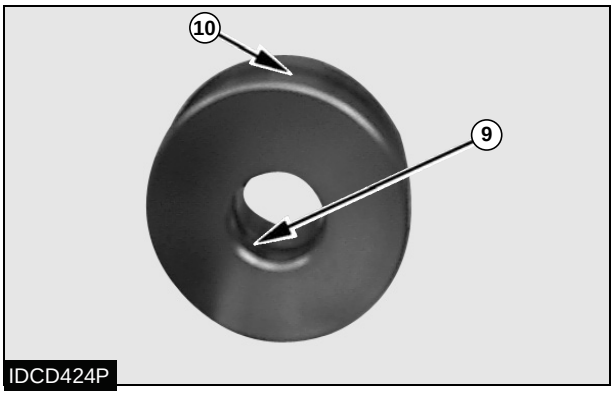
4. Remove piston and seal assembly (4) from the cylinder rod.

5. Remove head assembly (5).

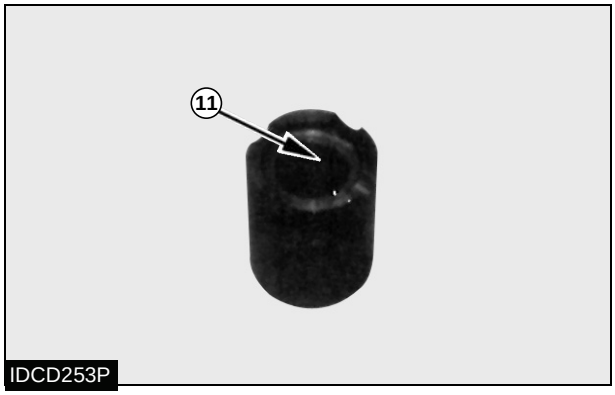


6. Remove spacer (6) from the cylinder rod.

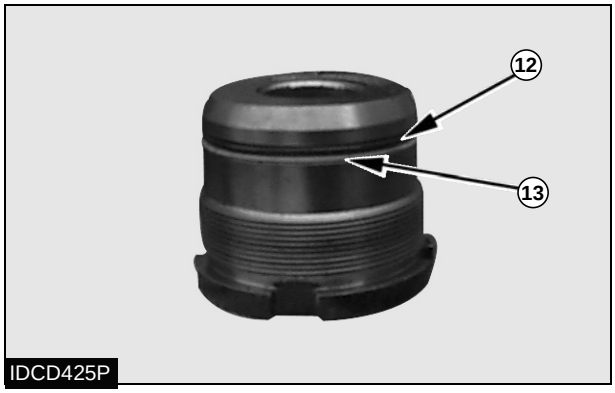
7. Loosen the nut and bolt on the rod eye Remove cylinder rod (7) and shims (8).



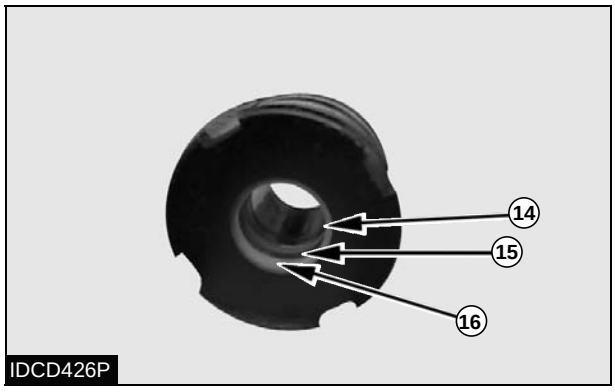
8. Remove seal assembly (10) and O-ring seal (9) from the piston.



9. Remove seal (11) from the spacer.

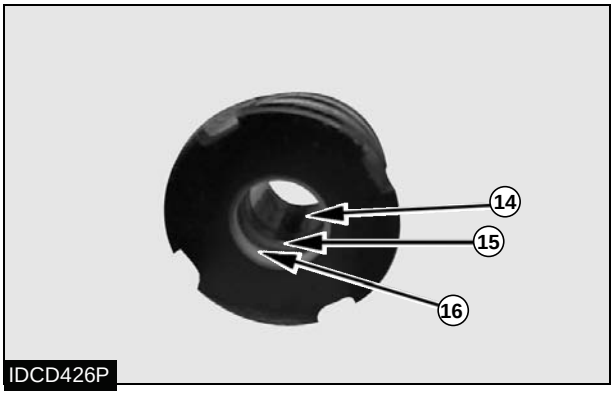


10. Remove O-ring seal (12) and back-up ring (13) from the head.



11. Remove seals (14), (15), and (16) from the head.

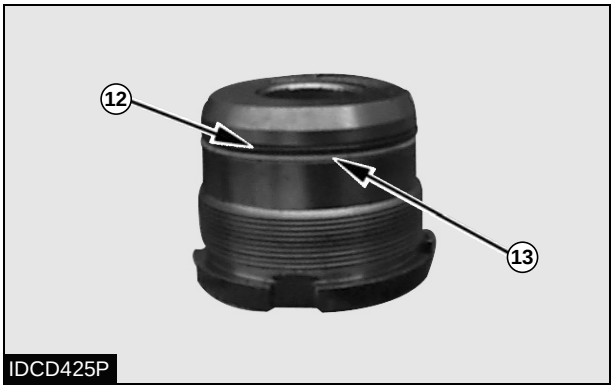
NOTE: Use the following steps to assemble the tilt cylinder.



12. Install seal (14) in the head. Position the lip of the seal toward the inside of the head.

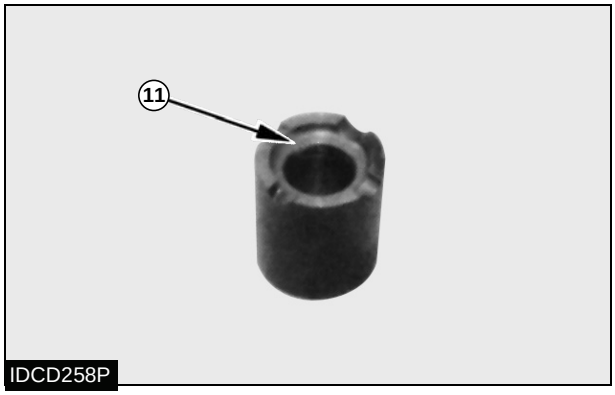
13. Install seal (15).

14. Install seal (16) in the cylinder head. Position the lip of seal (16) toward the outside of the cylinder head.

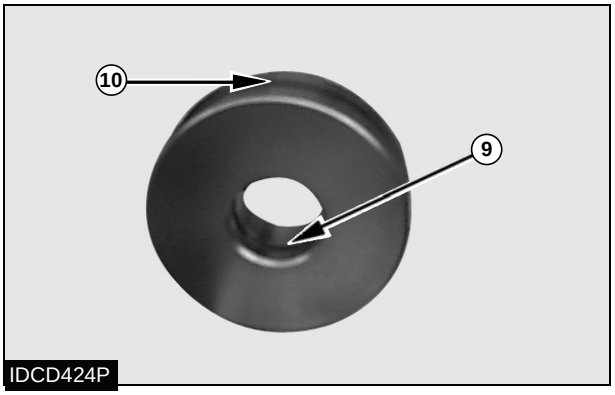


NOTE: The curved side of back up ring (13) should contact O-ring seal (12).

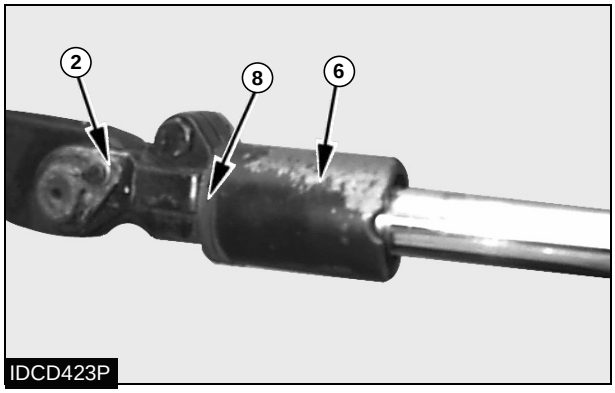
15. Install O-ring seal (12) and back-up ring (13). Make sure the curved side of back-up ring (13) is in contact with O-ring seal (12).



16. Install seal (11) in the spacer.

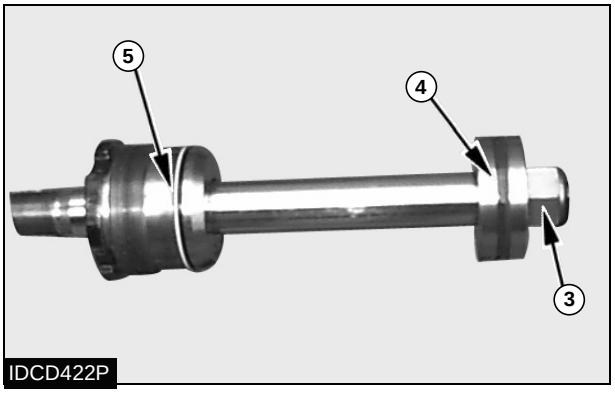


19. Install seals (10) and O-ring seal (9) on the piston



17. Install spacer (6).

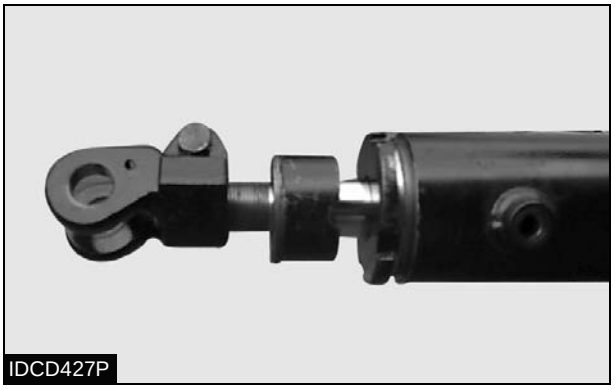
18. Install shims (8) and rod eye (2). Tighten the bolt on rod eye (2) to a torque of **95±15 N·m (70±11 lb·ft)**.



20. Install head assembly (5) on the cylinder rod.

21. Install piston assembly (4) onto the cylinder rod.

22. Install nut (3). Tighten nut (3) to a torque of 270±30 N·m (200±22 lb·ft).



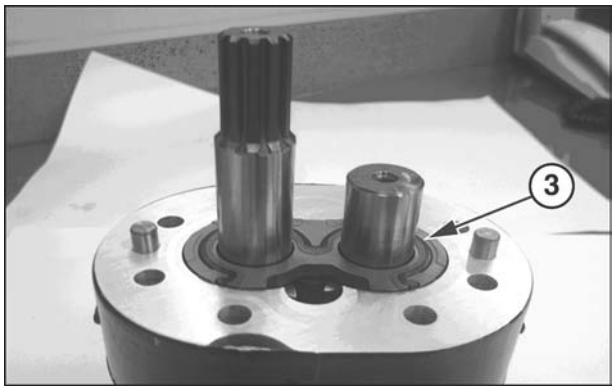
23. Install the rod assembly in the cylinder body.

Disassemble & Assemble Master hydraulic Pump

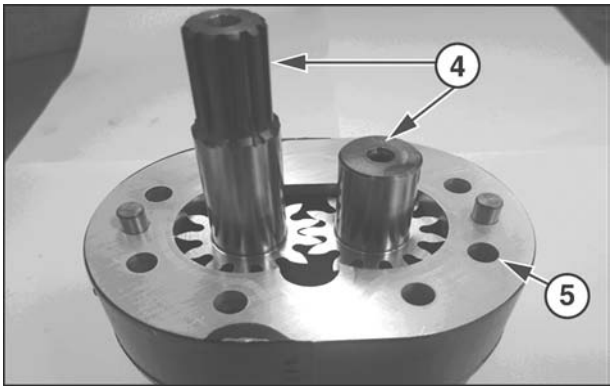
for D20/25/30S-5, G20/25/30E-5, G20/25/30P-5 ,GC20/25/30E-5, GC20/25/30P-5

1. Remove the eight screw bolts (1).

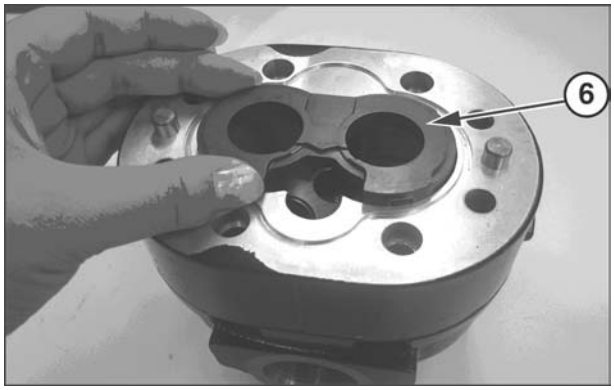
2. Remove a mounting flange (2) from pump assembly.



3. Remove a wear plate (3) from pump assembly.

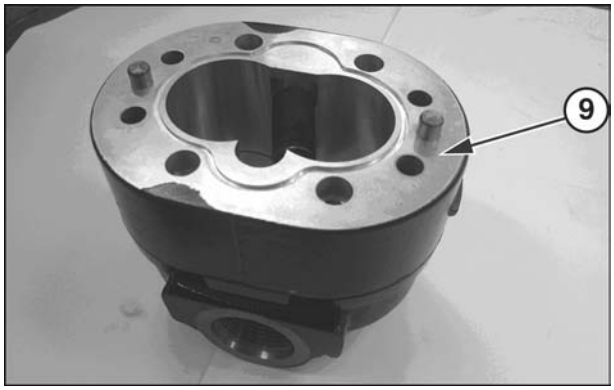


4. Remove a gear assemble (4) from a gear body (5)

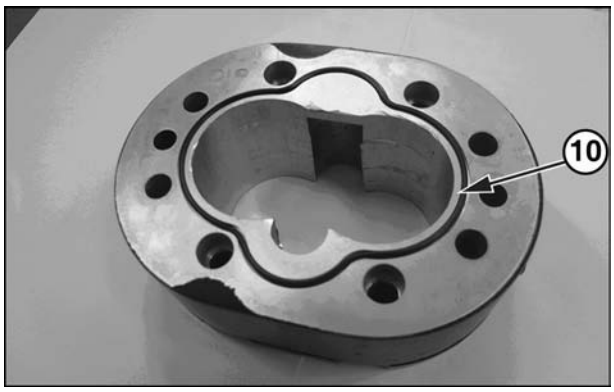


5. Remove a wear plate (6) from a bottom of gear body.

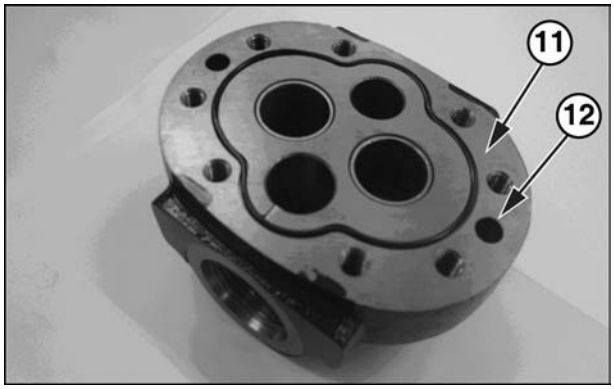
6. Remove a seal (7) and a back up gasket (8) from a wear plate.



7. Remove gear body (9).



8. Remove a seal (10) from gear body.



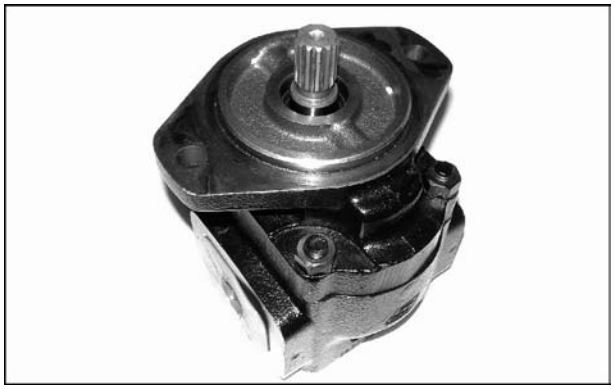
9. Remove a seal (11) from an end block (12).

10. Assemble the pump in the reverse order of disassembly.

Tightening torque of each screw bolt; 34 to 37 N.m

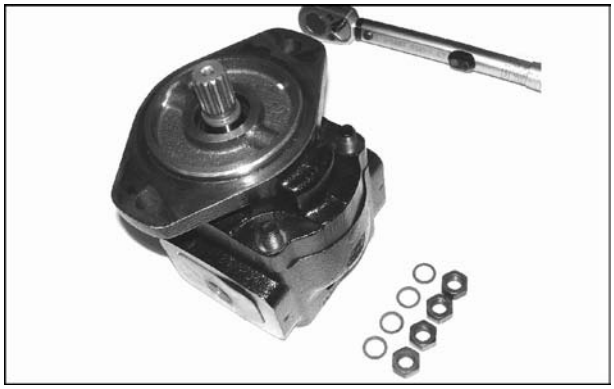
Disassembly of Pump

for D33SC, D35SC, G33P, G35P

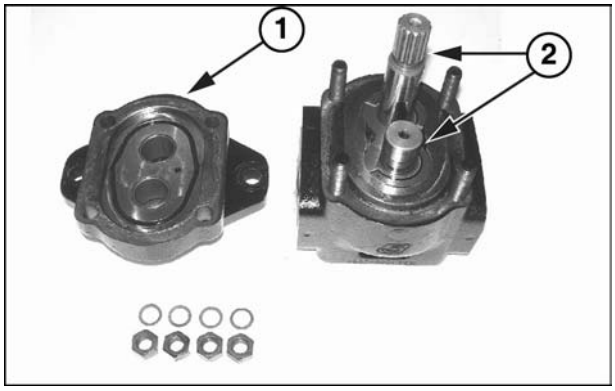


1 . Put the unit back side down to your work place.

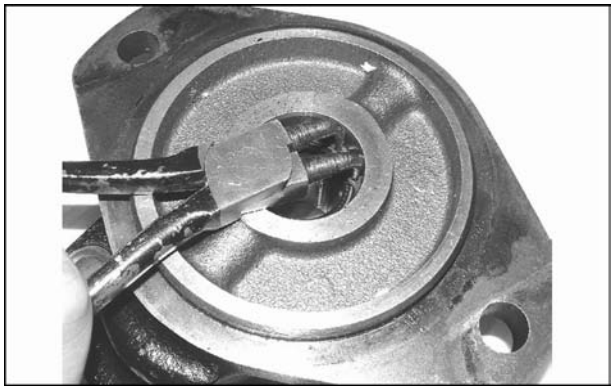
2. Remove all fasteners, bolts and units.



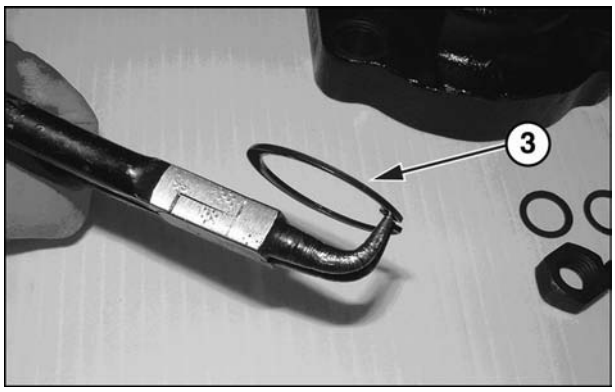
3. Put all removed parts on a safe place.



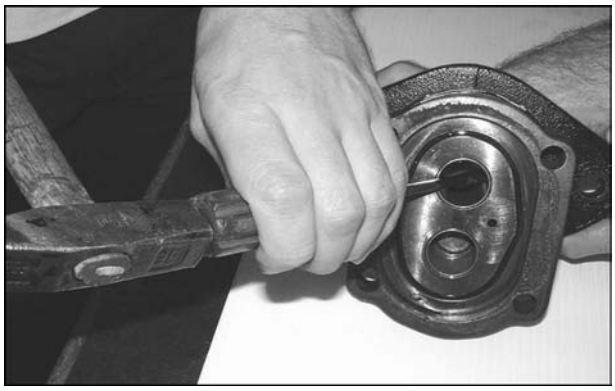
4. Remove the mounting flange (1) and gear sets (2) from the bottom of body.



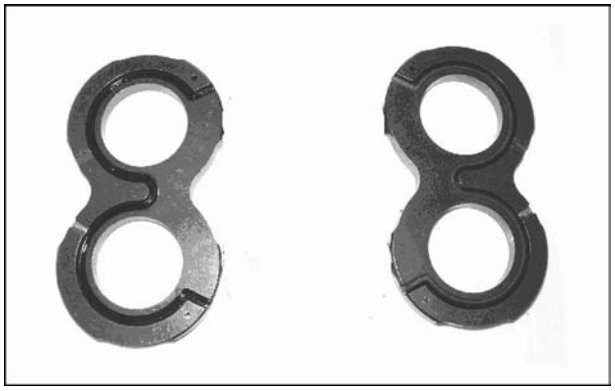
5. Remove the snap ring (3).



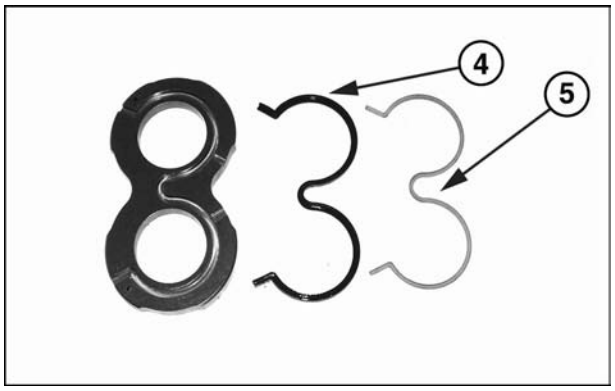
6. Use proper and safe tools for the operation



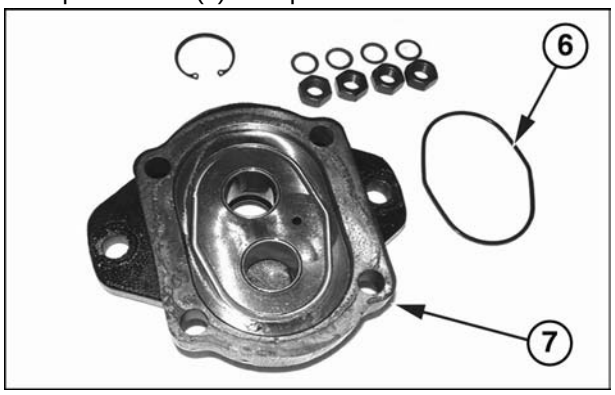
7. Push out shaft seal



8. Check balance plates, and sealing parts.



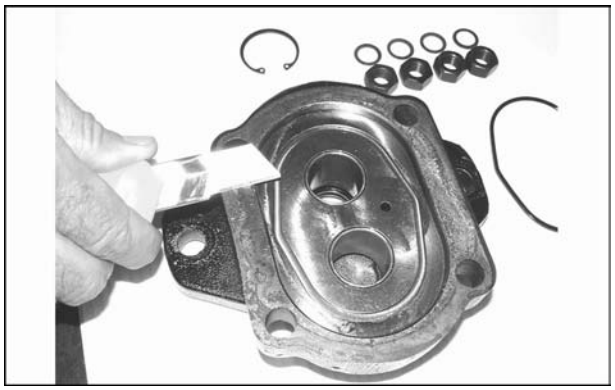
9. Assemble new sealing parts, the rubber seal first (4), the plastic seal (5) on top.



10. Remove the section seal (6) from the mounting flange (7).

11. Clean all mounting faces of the mounting flange from sealant and dirt.

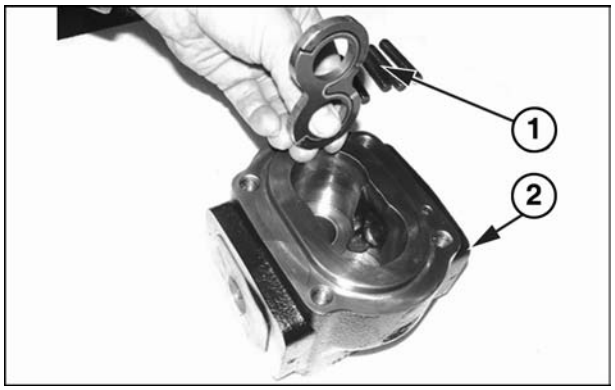
12. Be careful, avoid mechanical surface damages.



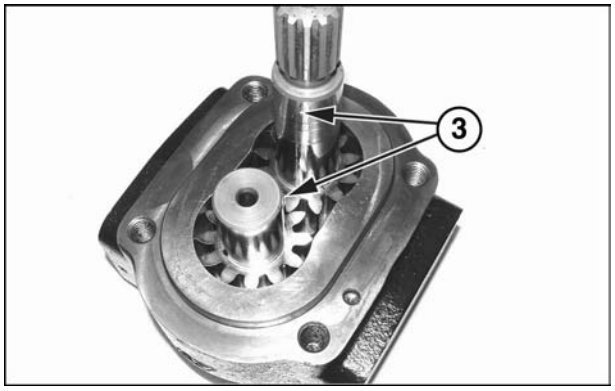
13. Clean all mounting faces of body from sealant and dirt.

Assembly of pump

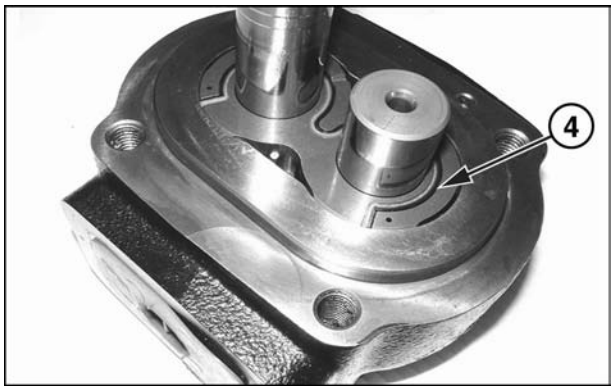
for D33SC, D35SC, G33P, G35P



1. Assemble the lower balance plate (1) into the body (2), sealing parts can be fixed with grease. Position is rotation sensitive!



2. Assemble carefully the gear set (3).

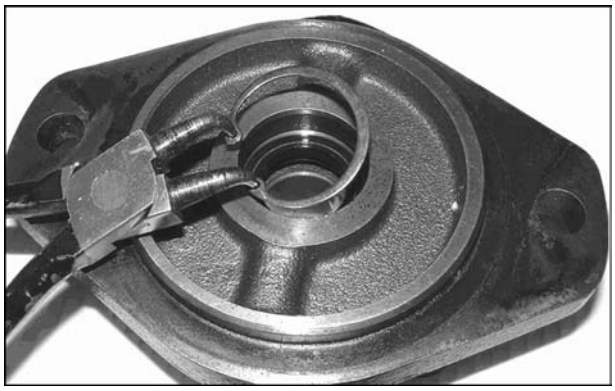


3. Put the upper balance plate (4) on top of the gear set. Position is rotation sensitive!

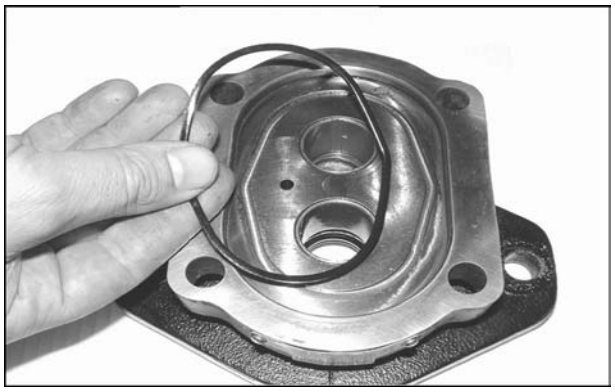
4. Prepare the shaft seal for assembly. Use a proper assembly fixture

5. The shaft seal should be packed with some grease.

6. Press in the shaft seal to bottom of the shaft seal bore.

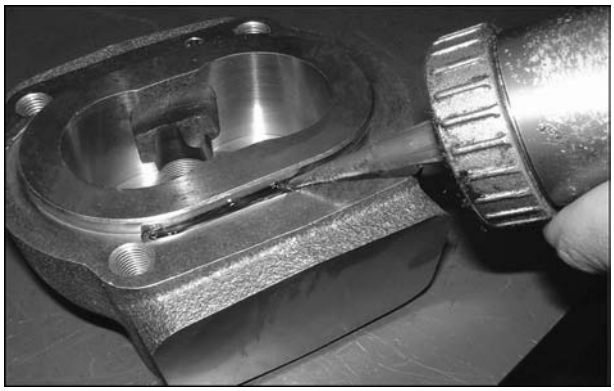


7. Assemble the snap ring.



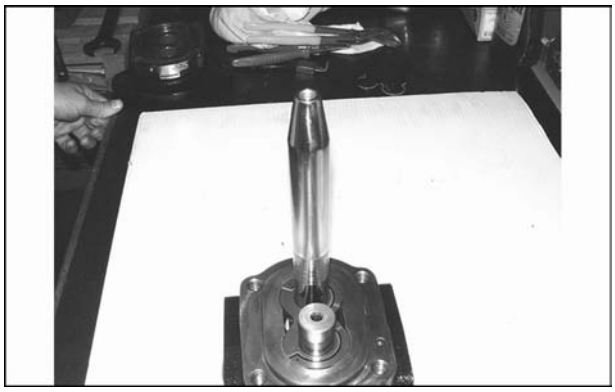
8. Check the section seal. Use of a new one is recommended in each case.

9. Clean all assembly faces again.

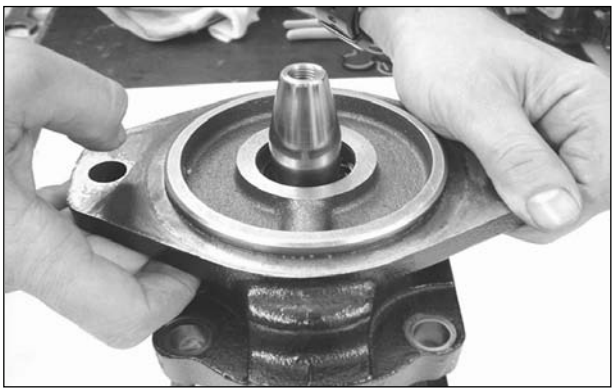


10. Put a rope of Loctite sealant out side the interlock track on the body (it's for corrosion protection)

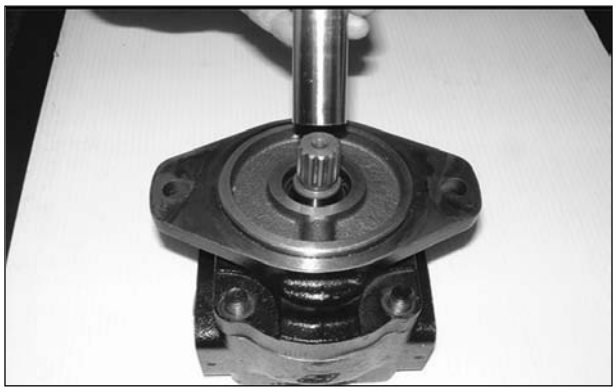
11. Fit an assembly fixture for shaft sea protection to the drive shaft.



12. The assembly fixture should be oiled with clean hydraulic fluid to lubricate the shaft seal lip during assembly.



13. Fit the mounting flange careful from top down to the body. Fit the interlock track correct.

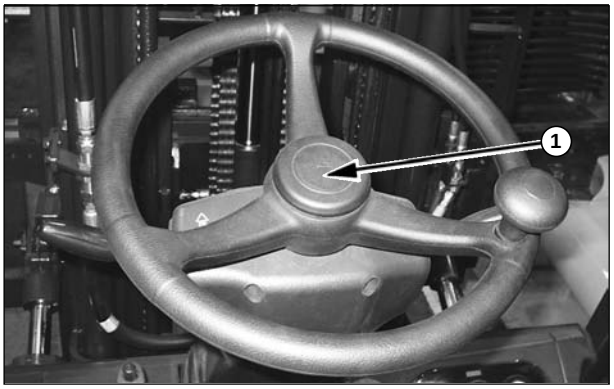


14. Remove the shaft seal protection fixture careful.

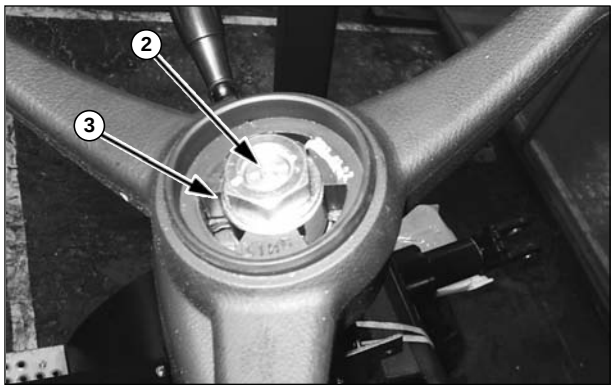
15. Fit fasteners, bolts or nuts with correct assembly torque.

Steering Wheel

Remove & Install Steering Wheel



1. Remove cap (1) from the steering wheel.



2. Remove nut (2) and washer (3) from the steering wheel shaft. Put location marks on the steering wheel and the steering wheel shaft for installation purposes.

3. Remove the steering wheel from the shaft.

NOTE : Use the following steps to install the steering wheel.

4. Put the steering wheel on the steering wheel shaft in its original position.

5. Install washer (3) and nut (2). Tighten nut (2) to a torque of 80 ± 7 N·m (60 ± 5 lb·ft).

6. Install cap (1).

Steering Unit

Remove & Install Steering Unit

Start By:

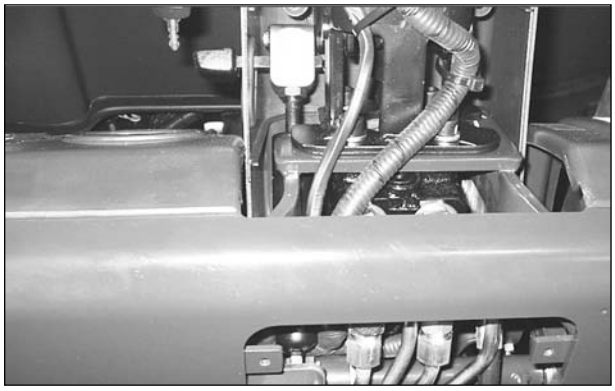
a. Remove covers from steering wheel group

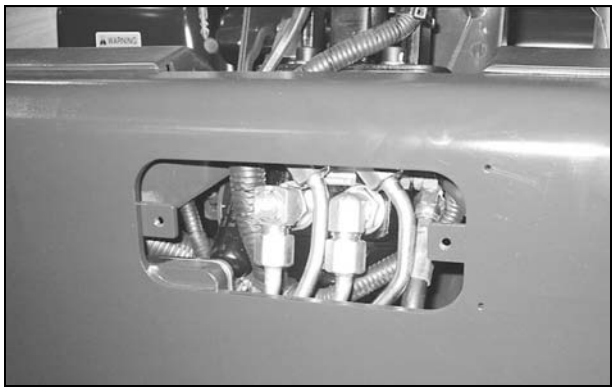
.

⚠ WARNING

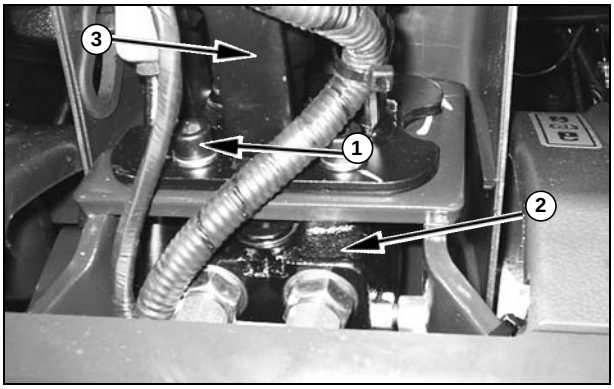
To prevent personal injury be sure pressure in the hydraulic system has been released before disconnecting any hydraulic lines. Slowly loosen the cap of the hydraulic tank to release any pressure in the tank. Be cautious of hot hydraulic oil when any lines are disconnected in the hydraulic system.

NOTE : Identify and mark all hydraulic hoses for purposes of reassembly.





1. Disconnect (4) tubes and (1) hose assembled to steering unit.



2. Remove four bolts (1).

NOTICE

Steering unit (2) and column (3) can separate after bolts (1) have all been removed, causing unit (2) to fall. To avoid damaging components, support the steering pump while removing bolts (1).

3. Support steering unit (2) while removing the remaining two bolts (1). Remove steering unit (2).

4. Install the steering unit in the reverse order of removal.

End By :

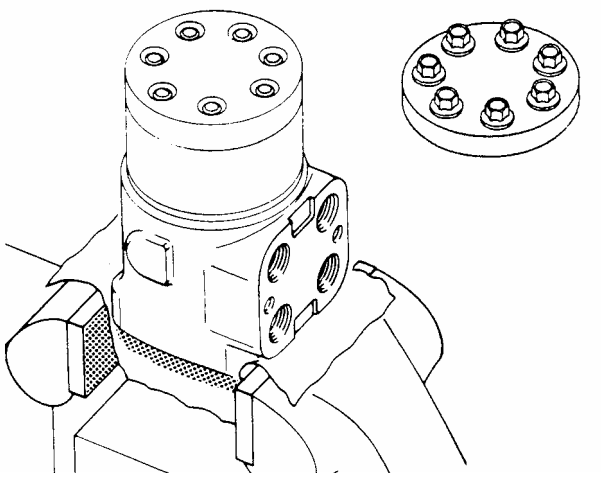
a. Install the cover on steering wheel group.

Disassemble Steering Unit

Cleanliness is extremely important when repairing a steering unit. Work in a clean area. Before disconnecting lines, clean port area of unit thoroughly. Use a wire brush to remove foreign material and debris from around exterior joints of the unit.

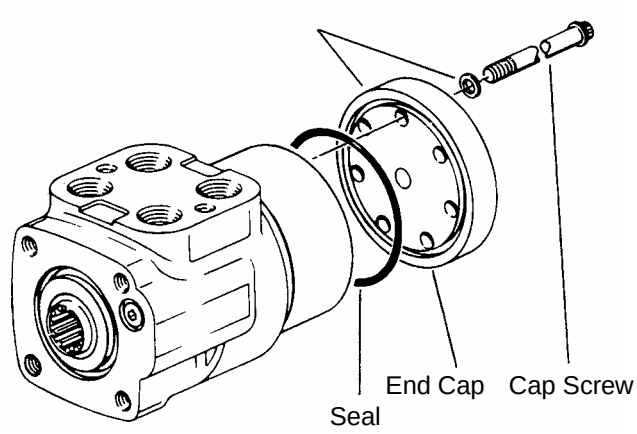
Although not all drawings show the unit in a vise, we recommend that you keep the unit in the vise during disassembly. Follow the clamping procedures explained throughout the manual.

Gerotor (Meter) End



IDCD278S

1. Clamp unit in vise, meter end up. Clamp lightly on edges of mounting area. Use protective material on vise jaws. Housing distortion could result if jaws are overtightened.

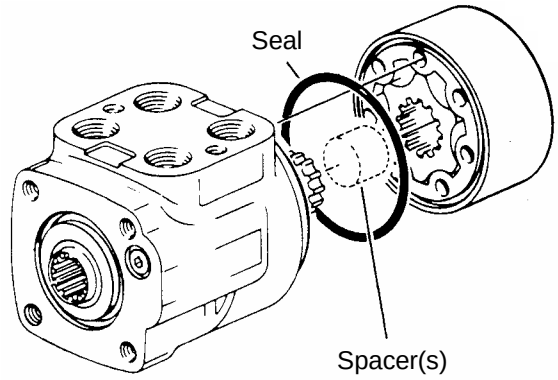


IDCD279S

2. Remove 5/16 inch cap screws and washers if applicable (7 each).

3. Remove end cap.

4. Remove seal from end cap.

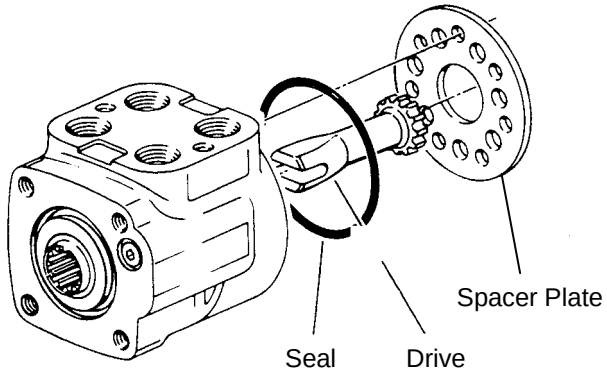


IDCD280S

5. Remove meter. Be careful not to drop star.

6. Remove seal from meter.

7. Remove drive spacer(s).



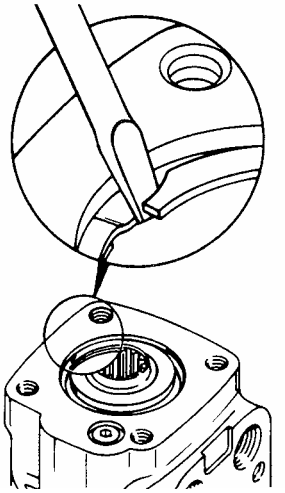
IDCD281S

8. Remove drive.

9. Remove spacer plate.

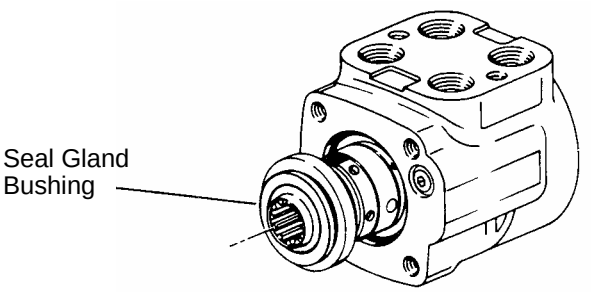
10. Remove seal from housing.

Control End



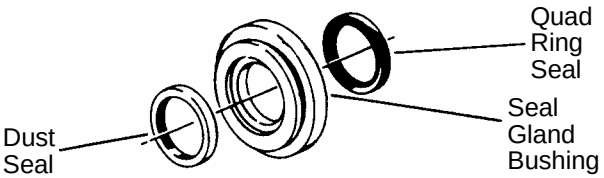
IDCD282S

11. Remove housing from vise. Place housing on a clean soft cloth to protect surface finish. Use a thin bladed screwdriver to pry retaining ring from housing.



IDCD283S

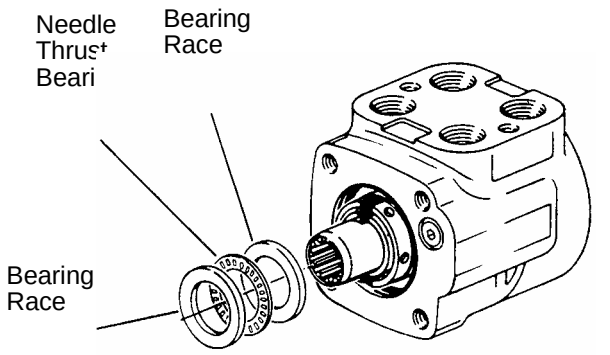
12. Rotate spool and sleeve until pin is horizontal. Push spool and sleeve assembly forward with your thumbs just far enough to free gland bushing from housing. Remove bushing.



IDCD284S

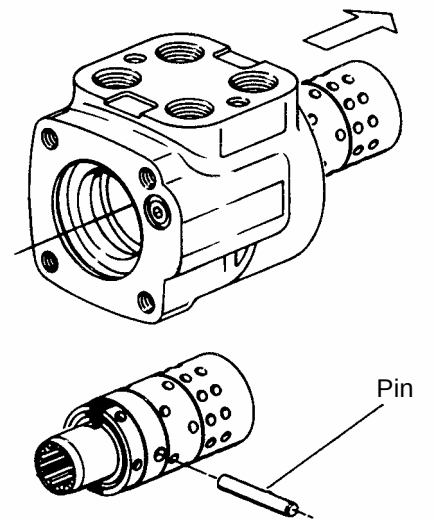
13. Remove quad ring seal from seal gland bushing.

14. Use a thin bladed screwdriver to pry dust seal from seal gland bushing. Do not damage bushing.



IDCD285S

15. Remove 2 bearing races and the needle thrust bearing from spool and sleeve assembly.

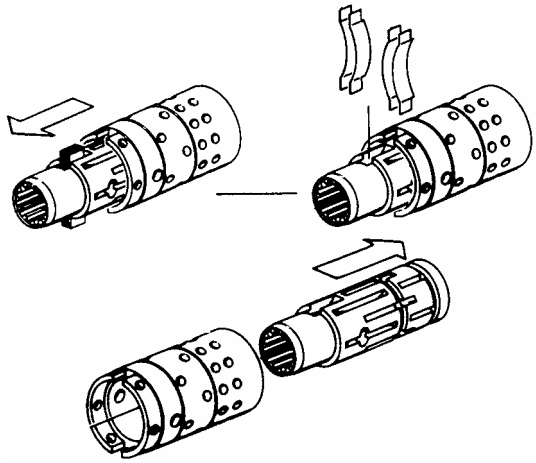


IDCD286S

16. Remove spool and sleeve assembly from 14 hole end of housing.

ATTENTION: Do not bind spool and sleeve in housing. Rotate spool and sleeve assembly slowly when removing from housing.

17. Push pin from spool and sleeve assembly.

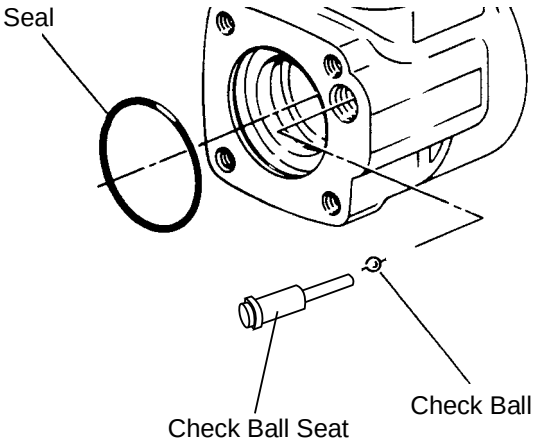


IDCD287S

18. Push spool partially from control end of sleeve, then remove 4 centering springs from spool carefully by hand.

19. Push spool back through and out of sleeve. Rotate spool slowly when removing from sleeve.

20. Remove seal from housing.



IDCD288S

21. Remove check ball seat.

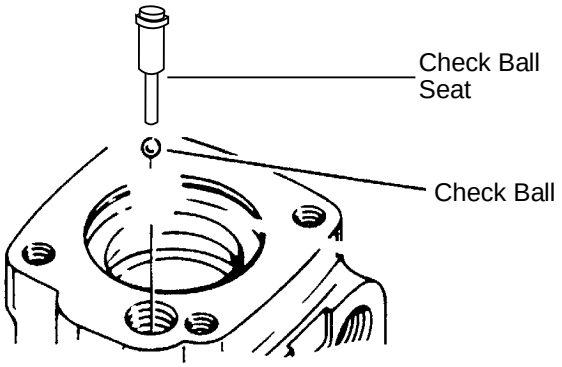
22. Tip housing to remove check ball.

Assemble Steering Unit

Check all mating surfaces. Replace any parts that have scratches or burrs that could cause leakage.
Clean all metal parts in clean solvent. Blow dry with air. Do not wipe dry with cloth or paper towel because lint or other matter can get into the hydraulic system and cause damage. Do not use a coarse grit or try to file or grind these parts.

NOTE: Lubricate all seals with clean petroleum jelly such as Vaseline.

Do not use excessive lubricant on seals for meter section.
Refer to parts listings covering your steering unit when ordering replacement parts. A good service policy is to replace all old seals with new seals.



IDCD289S

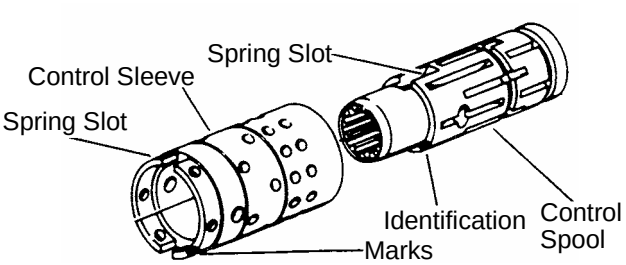
1. Use a needle nose pliers to lower check ball retainer into check valve hole of housing. Make sure retainer is straight (not tilted on edge) in housing.

2. Install check ball in housing

3. Lubricate 9.3 mm [.36 in.] ID seal and 7.7 mm [.30 in.] ID seal. Install seals on check ball seat as shown.

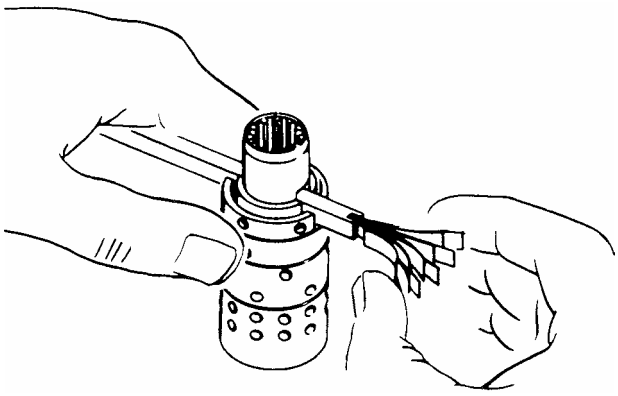
4. Lubricate check ball seat and seals thoroughly before installing seat in housing. When installing seat do not twist or damage seals. Install check ball seat in housing, insert open end of seat first. Push check ball seat to shoulder of hole.

5. Install set screw. Use a 1/4 inch hex key to torque set screw to 11 N·m [100 lb·in]. To prevent interference make sure top of set screw in slightly below housing mounting surface.



IDCD290S

6. Assemble spool and sleeve carefully so that the spring slots line up at the same end. Rotate spool while sliding parts together. Some spool and sleeve sets have identification marks, align these marks. Test for free rotation. Spool should rotate smoothly in sleeve with finger tip force applied at splined end.



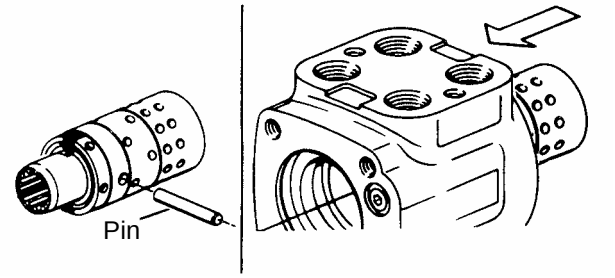
IDCD291S

7. Bring spring slots of both parts in line and stand parts on end of bench. Insert spring installation tool through spring slots of both parts. Position 2 pairs of centering springs on bench so that extended edge is down and arched center section is together. In this position, insert one end of entire spring set into spring installation tool, with spring notches facing sleeve.

8. Compress extended end of centering spring set and push into spool sleeve assembly withdrawing installation tool at the same time.

9. Center the spring set in the parts so that they push down evenly and flush with the upper surface of the spool and sleeve.

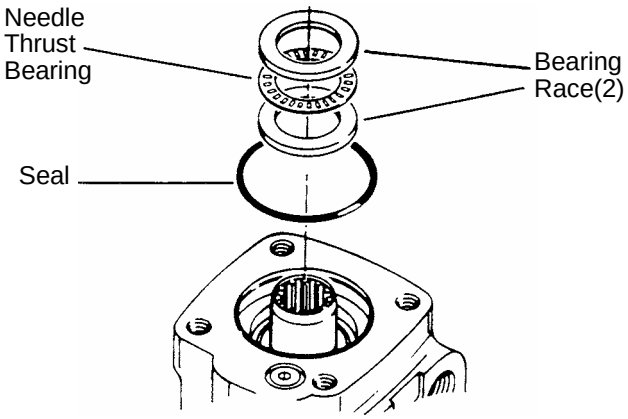
10. Install pin through spool and sleeve assembly until pin is flush at both sides of sleeve.



IDCD292S

11. Position the spool and sleeve assembly so that the splined end of the spool enters the 14 hole end of housing first.

ATTENTION: Be extremely careful that the parts do not tilt out of position while inserting. Push parts gently into place with slight rotating action, keep pin nearly horizontal. Bring the spool assembly entirely within the housing bore until the parts are flush at the meter end or 14 hole end of housing.
Do not pull the spool assembly beyond this point to prevent the cross pin from dropping into the discharge groove of the housing. With the spool assembly in this flush position, check for free rotation within the housing by turning with light finger tip force at the splined end.



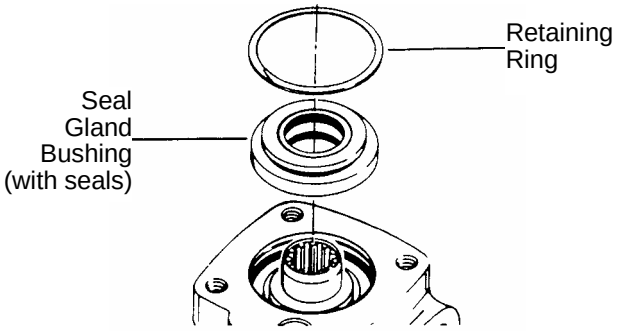
IDCD293S

12. Place housing on clean lint free cloth. Install 47.5 mm [1.86 in.] ID seal in housing.

13. Install 2 bearing races and the needle thrust bearing in the order shown.

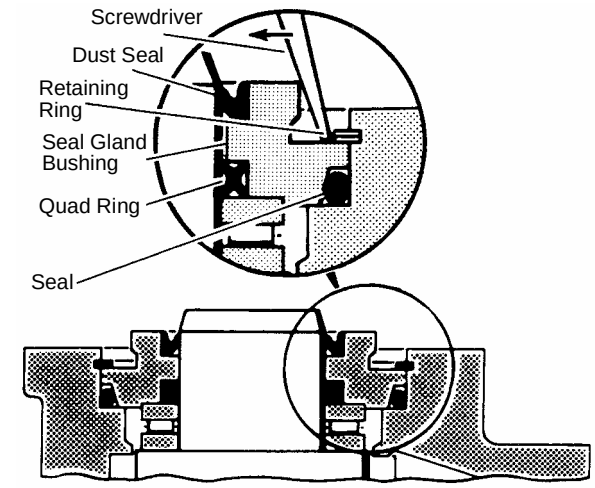
14. Install 25 mm [1 in.] ID dust seal in seal gland bushing, flat or smooth side must face down towards bushing.

15. Install the quad ring seal in seal gland bushing. Smooth seal in place with your finger. Do not use any seal that falls freely into pocket of bushing.



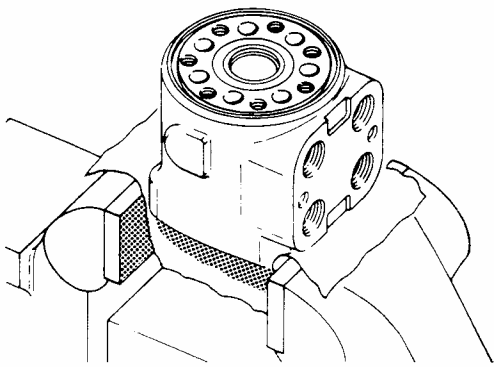
IDCD294S

16. Install seal gland bushing over the spool end with a twisting motion. Tap the bushing in place with a rubber hammer. Make sure the bushing is flush against the bearing race.



IDCD295S

17. Install retaining ring in housing. After installing ring, tap on ring end or pry with screwdriver around entire circumference of ring to properly seat ring in groove.

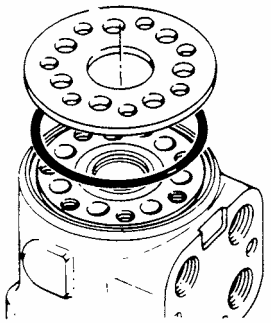


IDCD296S

18. Clamp housing in vise. Clamp lightly on edges of mounting area. Do not over tighten jaws.

NOTE: Check to insure that the spool and sleeve are flush or slightly below the 14 hole surface of the housing.

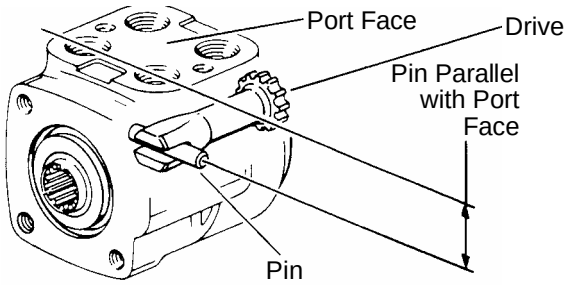
ATTENTION: Clean the upper surface of the housing by wiping with the palm of clean hand. Clean each of the flat surfaces of the meter section parts in a similar way when ready for reassembly. Do not use cloth of paper to clean surfaces.



IDCD293S

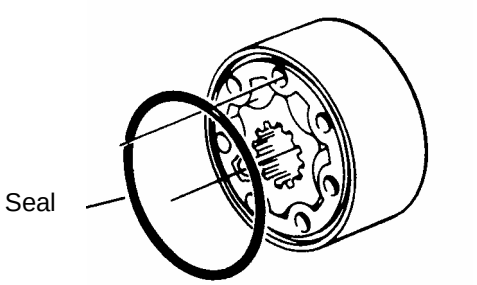
19. Install 73.5 mm [2.89 in.] ID seal in housing.

20. Install spacer plate. Align bolt holes in spacer plate with tapped holes in housing.



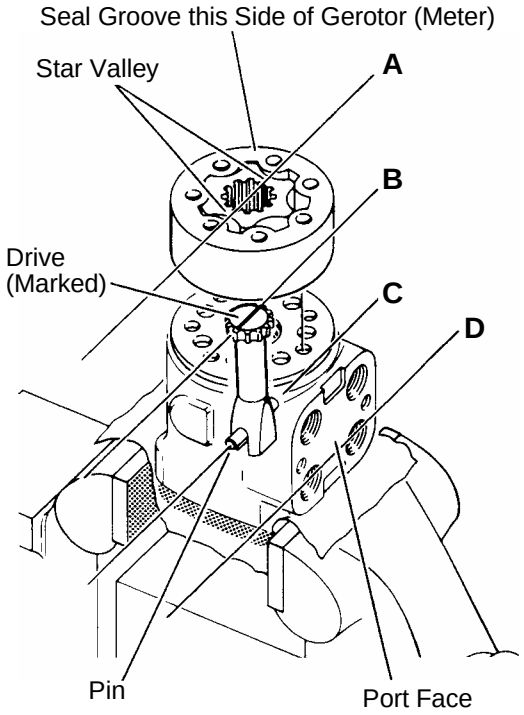
IDCD298S

21. Rotate spool and sleeve assembly until pin is parallel with port face. Install drive, make sure you engage drive with pin. To assure proper alignment, mark drive as shown. Note relationship between slotted end of drive to splined end of drive when marking.



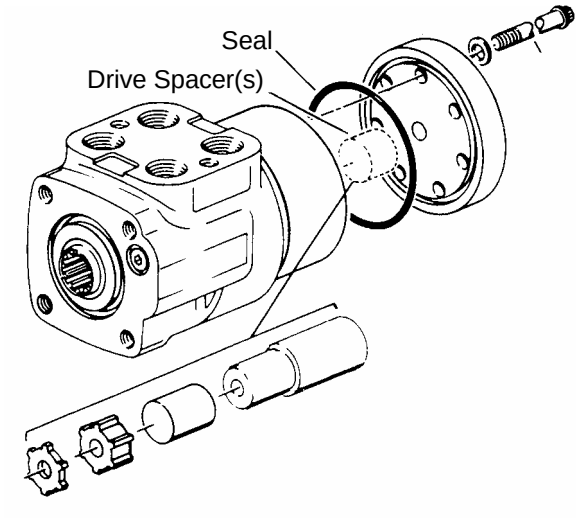
IDCD299S

22. Install 73.5 mm [2.89 in.] ID seal in spacer plate or gerotor (meter).



IDCD300S

23. With seal side of meter toward spacer plate, align star valleys on drive. Note the parallel relationship of reference lines A, B, C, and D. Align bolt holes without disengaging meter from drive.



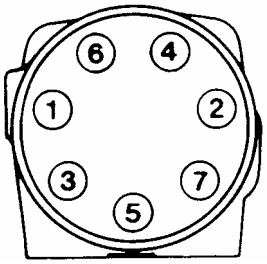
IDCD301P

Actual Displacement cm³/r(in/r)	Spacer
	Length mm [in.]
45 [2.8]	None
60 [3.6]	None
75 [4.5]	None
95 [5.9]	3.56 [.140]
120 [7.3]	6.10 [.240]
145 [8.9]	10.29 [.405]
160 [9.7]	12.19 [.480]
185 [11.3]	15.62 [.615]
230 [14.1]	21.97 [.865]
295 [17.9]	28.45 [1.120]
370 [22.6]	41.15 [1.620]
460 [28.2]	53.67 [2.113]
590 [35.9]	66.37 [2.613]
740 [45.1]	91.77 [3.613]

24. Install drive spacer (s) when used, in meter.

25. Install 73.5 mm [2.89 in.] ID seal in gerotor (meter) or end cap, see notes.

26. Install end cap on gerotor, align holes.



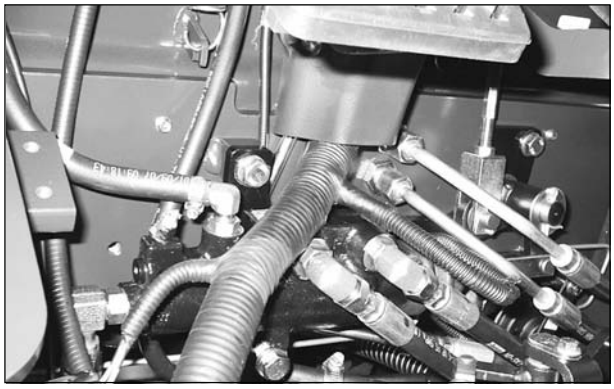
IDCD302P

27. Install 7 dry cap screws in end cap. Pretighten screws to 11-17 N·m [100-150 lb·in] then torque screws to specifications.

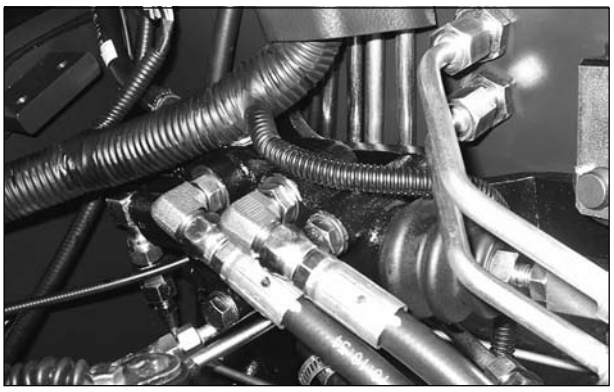
Master cylinder

Remove & Install Master cylinder

NOTE : Plug and cap all openings to avoid contamination and debris from entering the system after removing any tubes or lines.



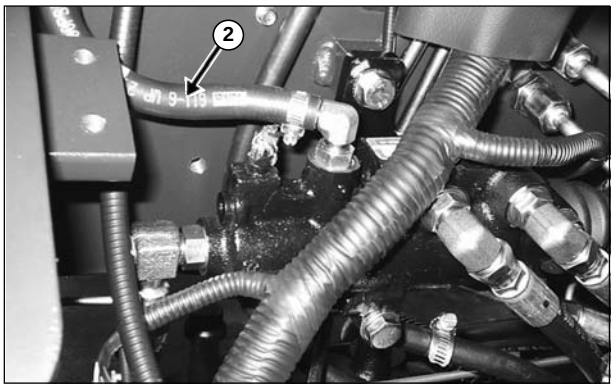
1. Before disconnecting the lines to master cylinder(1), prepare the proper plugs.

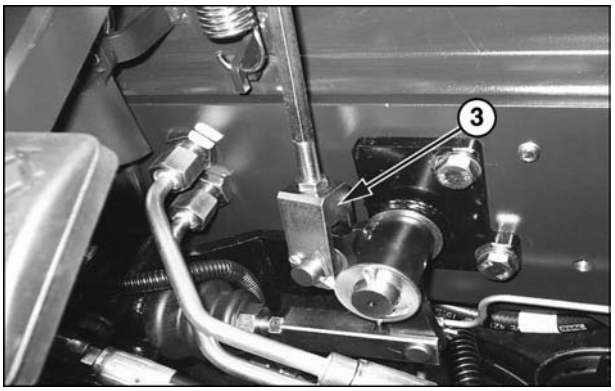


2. Disconnect the hoses and the tubes assembled to master cylinder, one by one.

Be sure that the oil in reservoir will be brained once the hose (2) is disconnected.

NOTE : Put the proper marking on the hoses not to be confused. Also, after being disconnected, put the proper plug or plugging on the hoses and tube.





3. Disconnect the yoke (3) from bell crank.

4. Dismount the master cylinder.

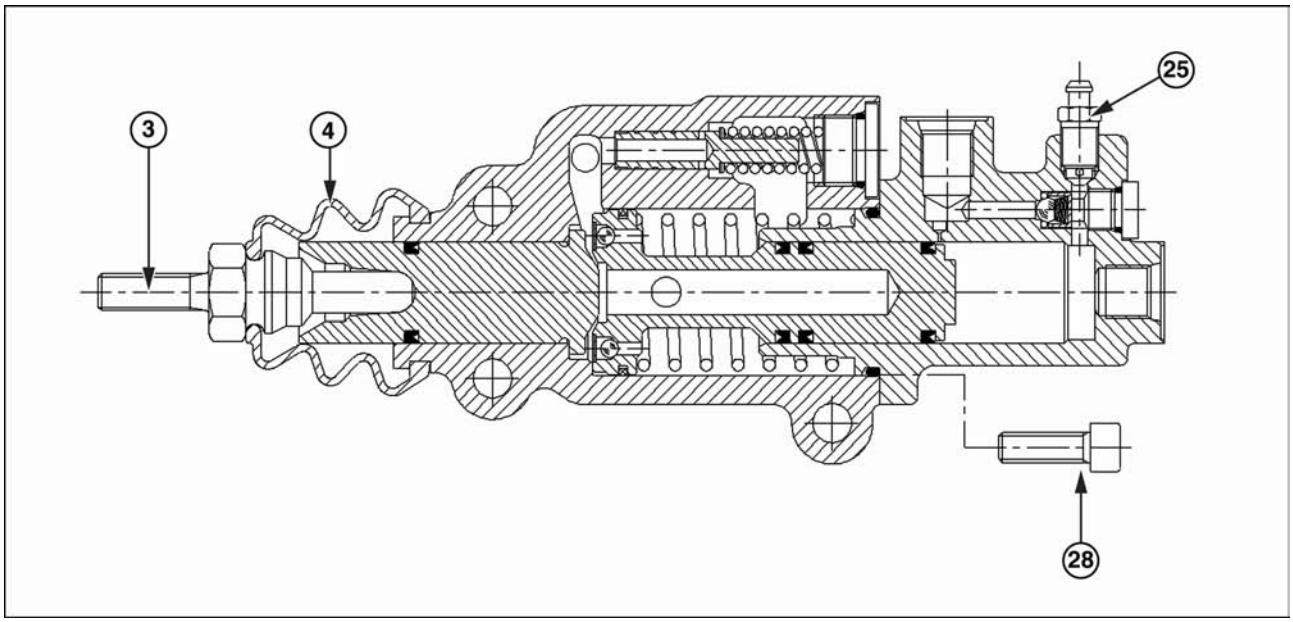
5. Install the waster cylinder in the reverse order of removal.

6. Fill the oil reservoir with the correct oil recommended at Operating & Maintenance manual.

7. Bleed the brake system. Refer to the Testing and Adjusting Manual for the further information.

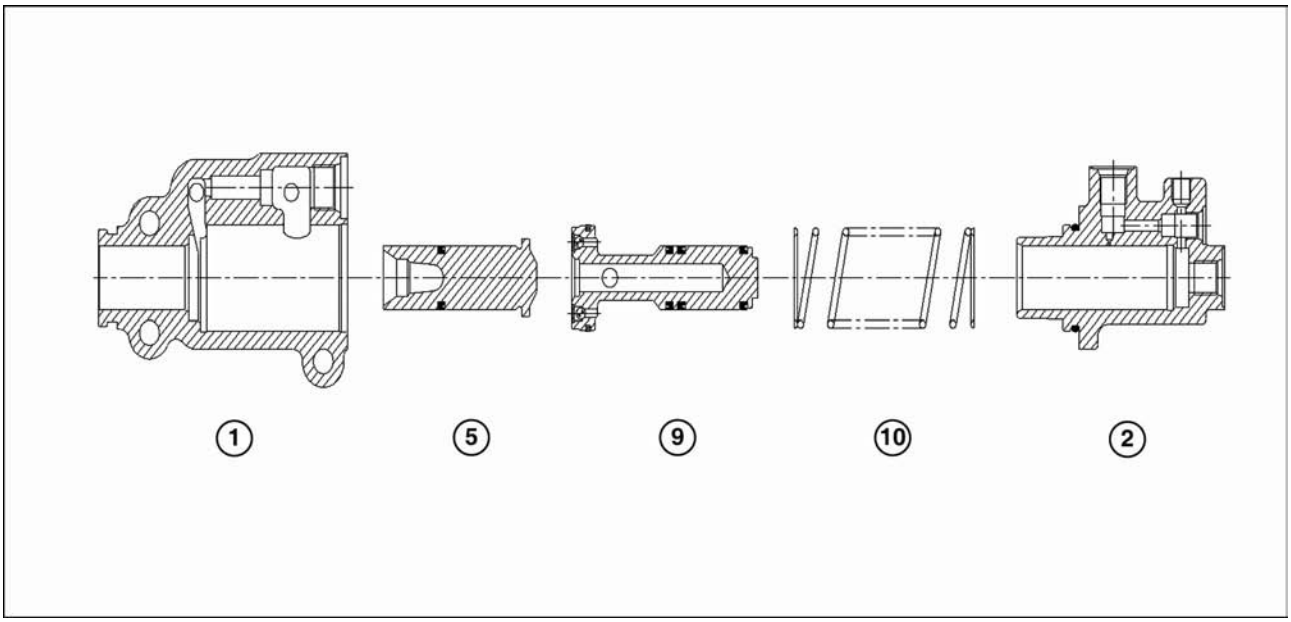
Master Cylinder

Disassemble & assemble brake valve

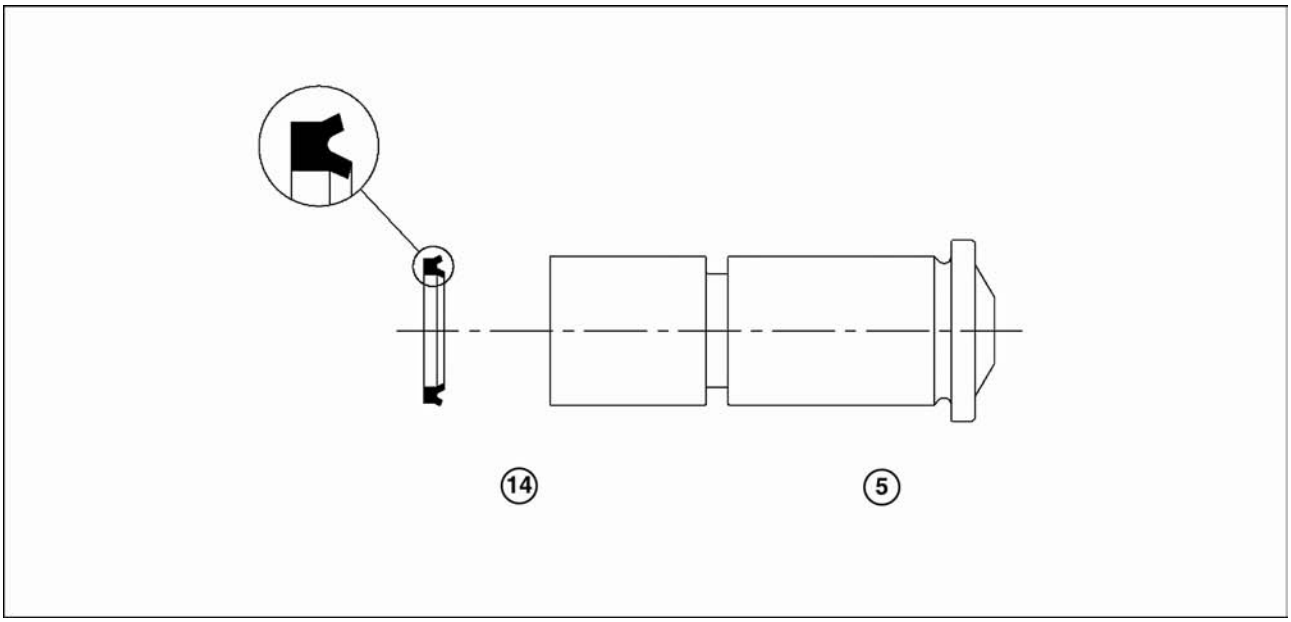


1. Take off bellows (4) and lift push rod (3), remove vent air (25) and bolts (28).

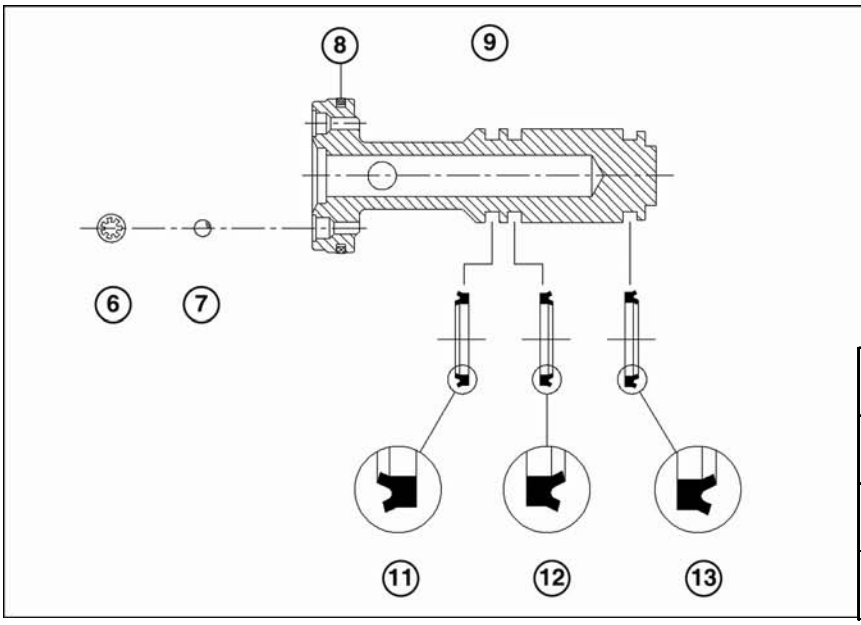
2. Separate the front housing (1) and rear housing (2), remove servo spring (10), servo piston (9) and master piston (5).



3. Take off seal u-cup (14) from master piston (5). Notice the direction of the seal.

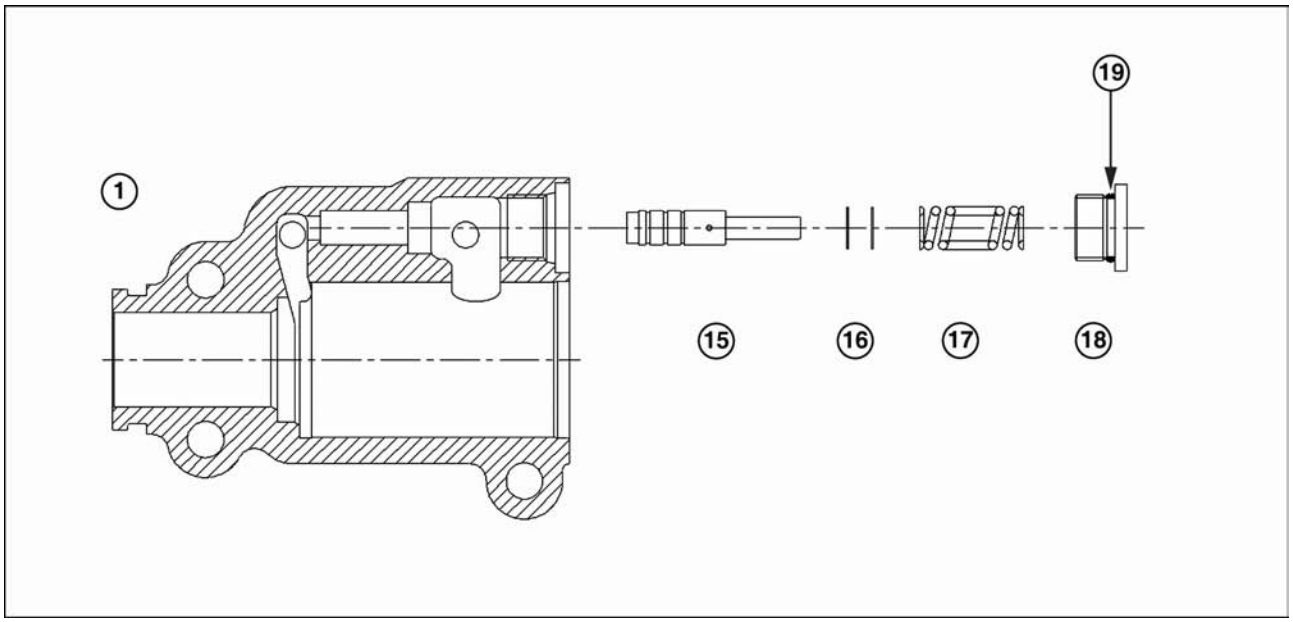


4. Remove lock washer (6) and ball (7) from servo piston (9). Pull off piston ring (8), seal u-cup (13), seal u-cup (12) and seal u-cup (11) in sequence. Notice the direction of each seal.

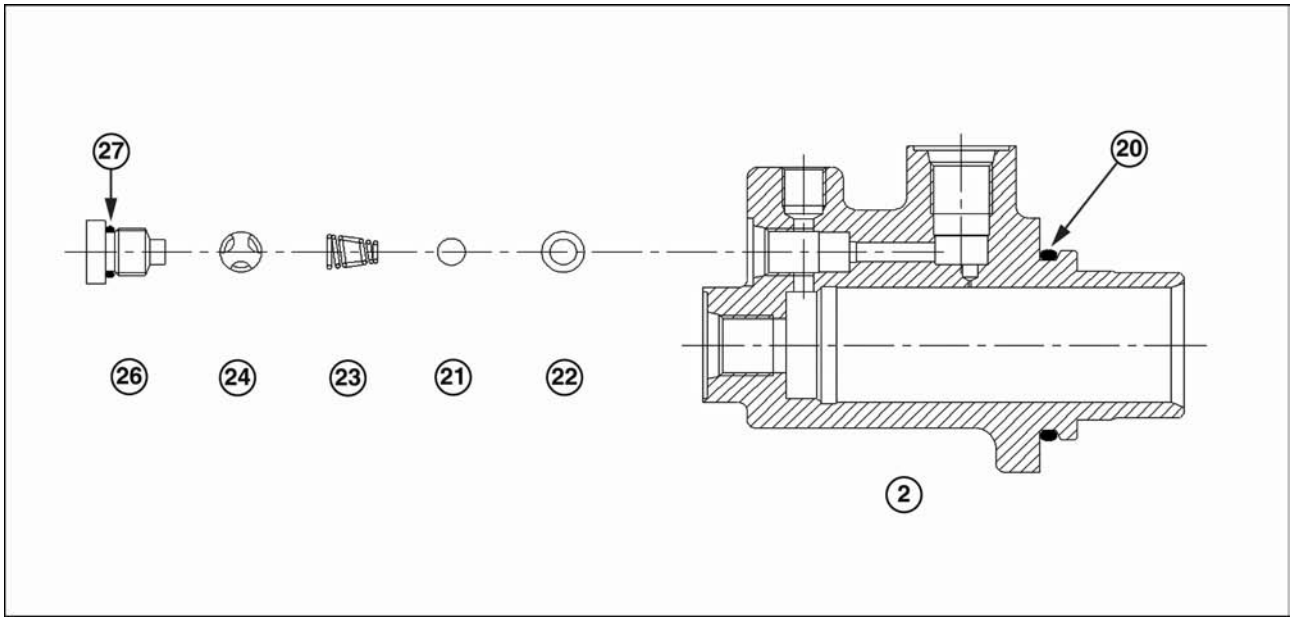


No	Color	Material
11	Translucency	Urethane
12	Black	NBR Hs70
13	Yellow	Urethane

5. Remove relief plug (18), o-ring (19), spring (17), shims (16) and piston (15) from front housing (1).



6. Remove check valve parts from rear housing (2): plug (26), o-ring (27), cage (24), spring (23), ball (21) and o-ring (22). Remove o-ring (20).



7. Assemble brake valve in the reverse order of disassembly.

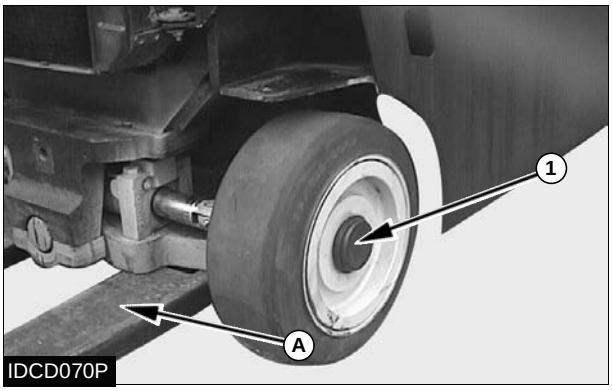
Steer Wheel & Bearing

Cushion truck

< Old type before 2008 year truck >

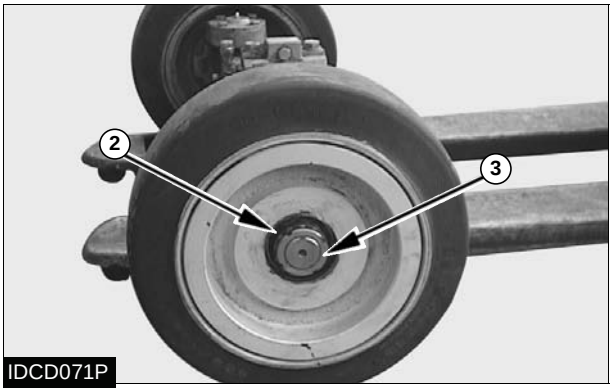
Tools Needed	A	B	C
Floor Jack	1		
Dirver Set		1	
Lock Nut Installer			1

NOTE : The procedure to remove the steer wheels is the same for the right and left steer wheel.



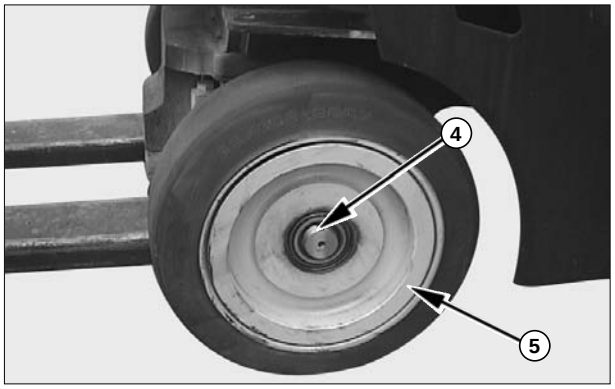
1. Support the steer axle with a floor jack (A).

2. Remove wheel cap (1).



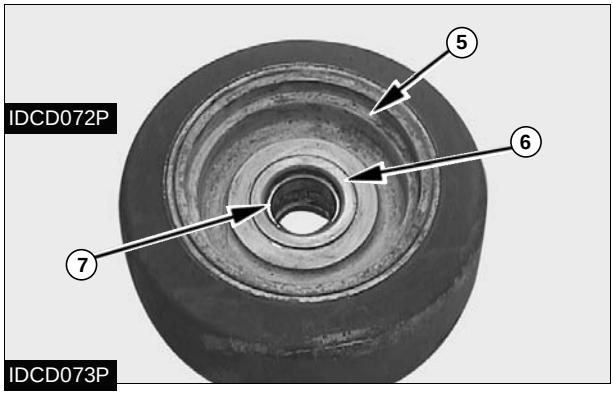
3. Bend the tab in locking washer (2) clear of the slot in nut (3).

4. Use tool (C) to remove nut (3). Remove locking washer (2)



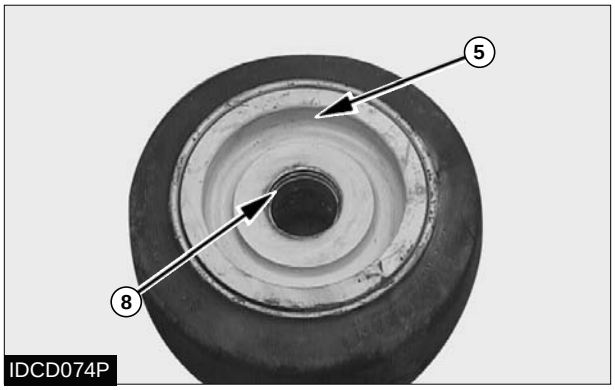
5. Remove bearing cone (4) from steer wheel (5).

6. Remove steer wheel (5). Steer wheel (5) weighs 34 kg (75 lb).



7. Remove seal (6) from the back of steer wheel (5).

8. Remove bearing cone (7) and the bearing cup from the back of steer wheel (5).



9. Remove bearing cup (8) from the front of steer wheel (5).

NOTE : Check the condition of all seals, bearings and components. If any parts are worn or damaged use new parts for replacement. For purposes of assembly, lower the temperature of the bearing cups and before installing into steer wheel (5). Use tooling (B) to install bearing cups and seals.

10. Pack bearing cones (4) and (7), and lubricate the contact surfaces of the bearing cups with Multipurpose Grease.

11. Reverse the procedures and steps 4 through 9 to install the steer wheels and bearings.

12. Adjust the steer wheel bearings as follows:

a. Use tool (C) to tighten nut (3) to a torque of 135 N·m (100 lb·ft) while slowly rotating steer wheel (5).

b. Use tool (C) to loosen nut (3) completely.

c. Use tool (C) to tighten nut (3) again to a torque of 50 ± 5 N·m (37 ± 4 lb·ft).

d. Bend a tab of locking washer (2) into a slot of nut (3).

13. Install wheel cap (1).

14. Remove tooling (A) and lower the lift truck.

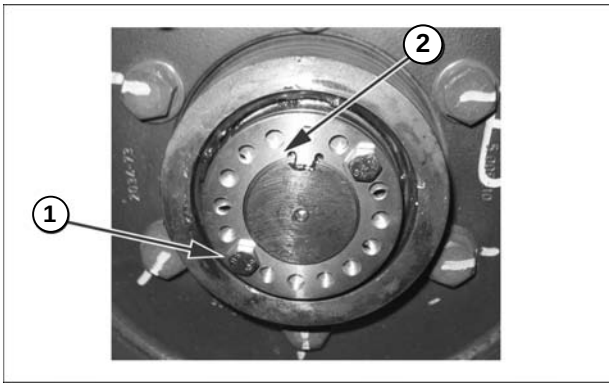
Pneumatic Truck and Cushion Truck sice 2008 year

Tools Needed	A	B	C
Floor Jack	1		
Torque wrench		1	
Lock Nut Installer			1

NOTE : The procedure to remove the steer wheels is the same for the right and left steer wheel.

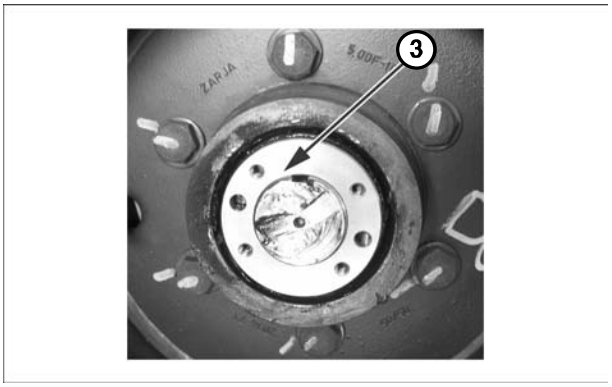
1. Support the steer axle or CTWT with a proper jack or hoist.

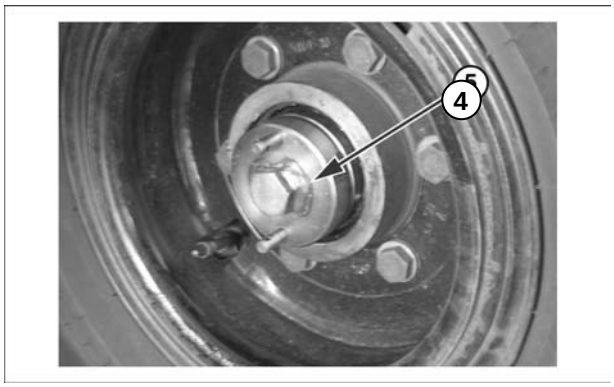
2. Remove wheel cap.



3. Remove the Bolts (1).

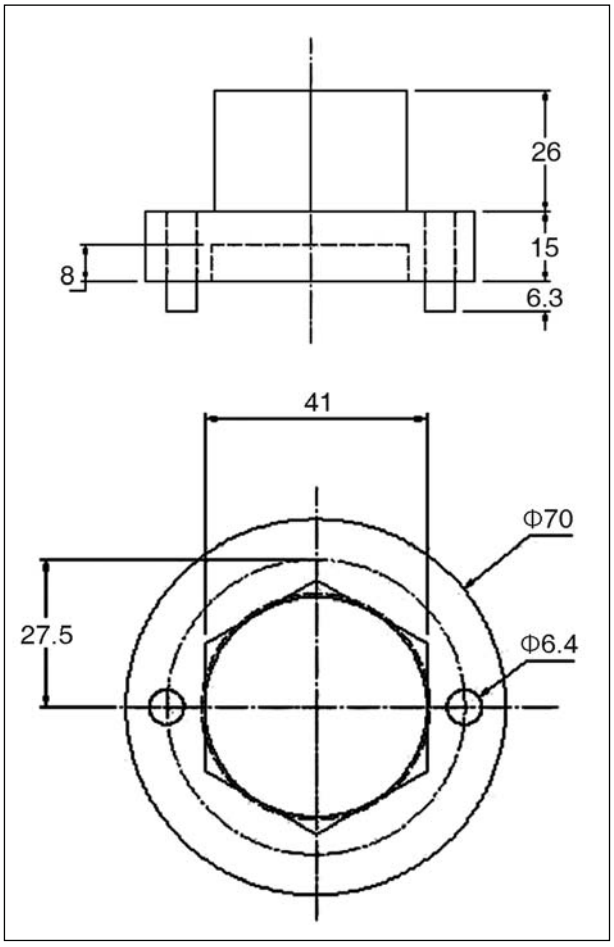
4. Remove the bearing lock washer (2).





5. Remove bearing lock nut (3) with the jig (4) like the picture.

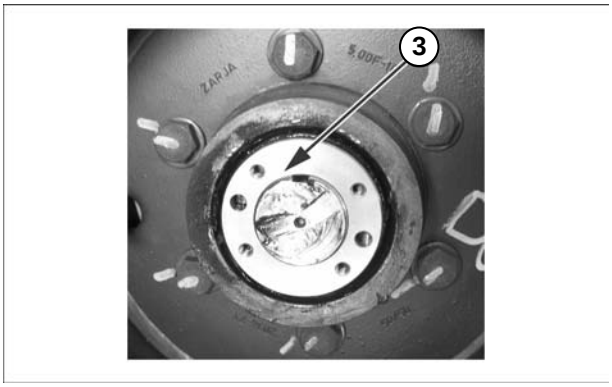
< Unit : mm >



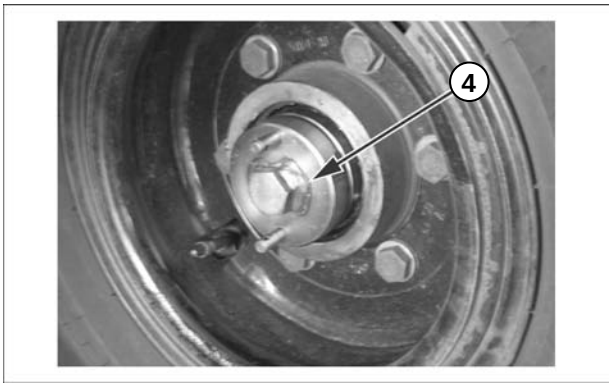
6. Remove bearing cone and cup from steer hub.

NOTE : Check the condition of all seals, bearings and components. If any parts are worn or damaged use new parts for replacement use tooling (C) to install bearing cups.

7. Pack bearing cones, and lubricate the contact surfaces of the bearing cups with Multipurpose Grease.



8. After putting the bearings, put the bearing lock nut (3).

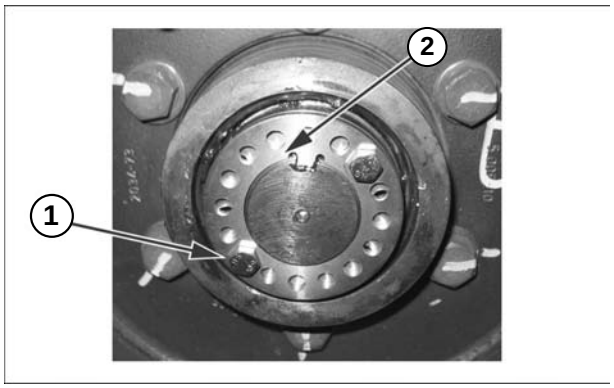


9. By using the tool (4), adjust the bearing as follows.

a. Use tool (4) to tighten nut (3) to a torque of **135 N•m (100 lb•ft)** while slowly rotating steer wheel.

b. Use tool (4) to loosen nut (3) completely.

c. Use tool (4) to tighten nut (3) again to a torque of **50±5 N•m (37±4 lb•ft).**



10. Put the bearing lock washer (2). Check out if two mounting bolt holes are aligned with the holes at bearing lock nut. If it doesn't match, rotate the bearing lock nut clockwise about, /32 turn.

11. Assemble (2) bolts after Loctite 242 is applied.

12. Pack the multipurpose grease inside the cap.

13. Fit the cap.

14. Remove a jack and lower the lift truck.

Tie Rod

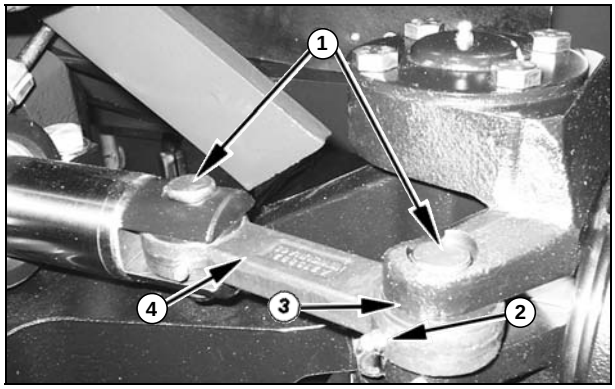
Remove and Install Tie Rod

Tools Needed	A	B
Floor Jack	1	
Driver Set		2

Start By :

a. Remove steer wheels.

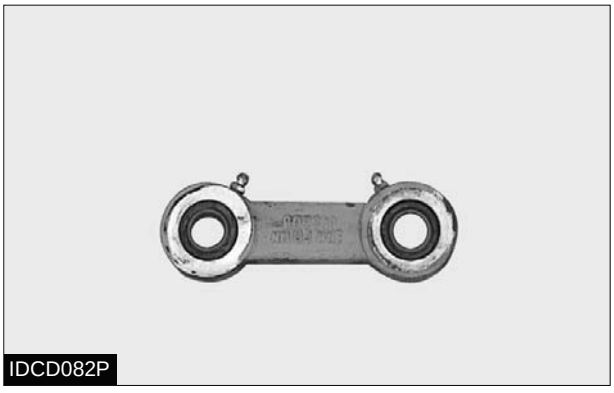
NOTE : The procedure to remove and install the tie rod is the same for each steer wheel.



1. Support the steer axle with a floor jack (A). Position the wheel to gain access to the tie rods.

2. Remove two pin retaining bolts (2). Remove pins (1).

3. Remove tie rod (4) and dust seals (3).



4. Use tooling (B) to remove bearings (5) from the tie rod.

5. Use tooling (B) to install new bearings (5) in the tie rod.

6. Install the tie rod in the reverse order of removal.

Steering Knuckle, Kingpin, and Bearing

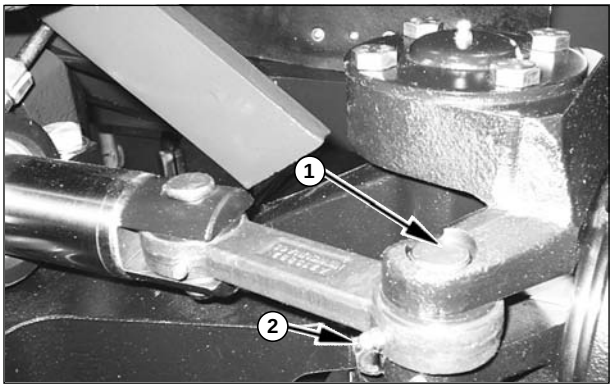
Remove and Install Steering Knuckle, King Pins and Bearing

Tools Needed	A
Drive Set	1

Start By:

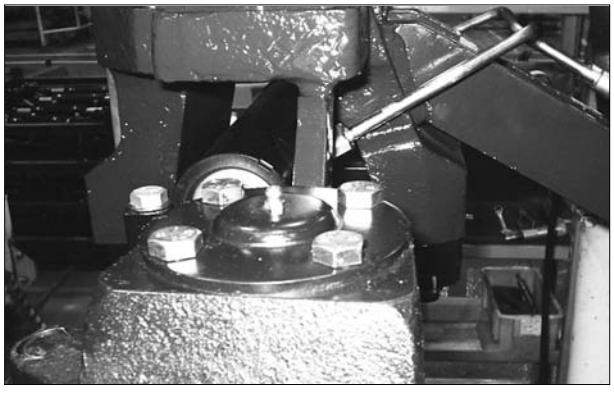
a. remove steer wheels

NOTE : The procedure to remove and install the steering knuckles, kingpins, and bearings is the same for both sides of the lift truck.

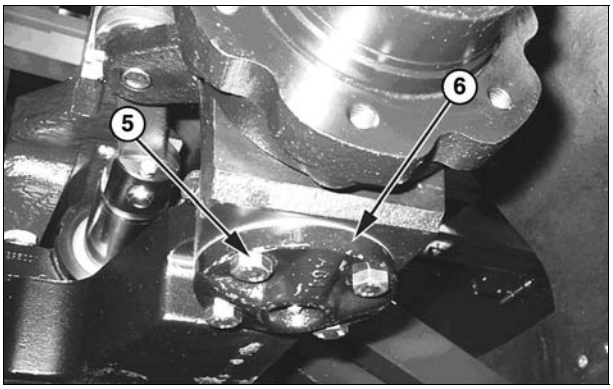


1. Remove pin retaining bolt (2). Remove pin (1).

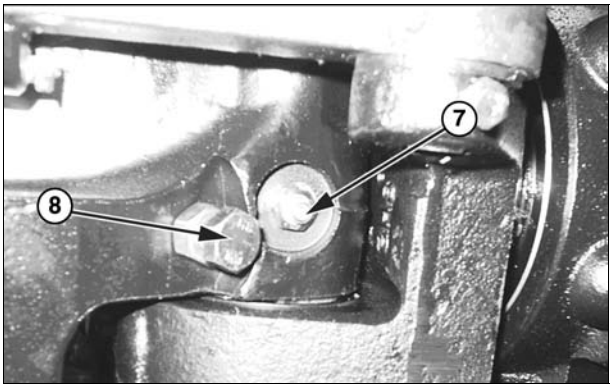
2. Position the tie rod away from the steering knuckle.



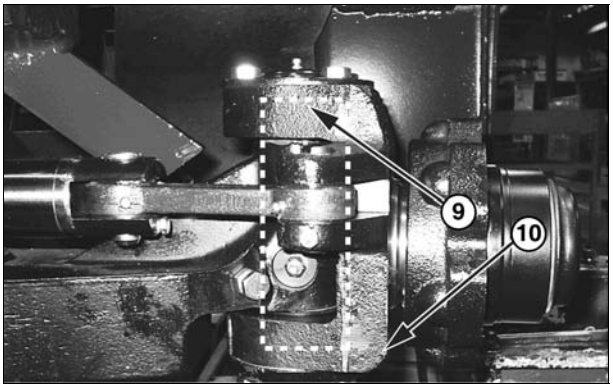
3. Remove four bolts (3) and cover (4).



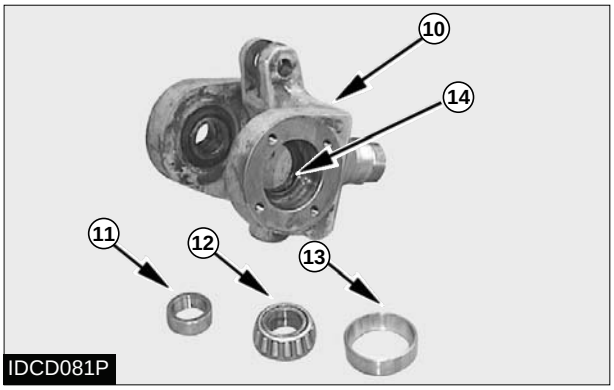
4. Remove four bolts (5) and cover (6).



5. Remove the nut (7) and bolt (8). For purposes of reassembly, the torque for bolt (7) is 11 ± 1 N·m(100 ± 9 lb·ft).



6. Remove kingpin (9) and knuckle (10).



7. Remove spacer (11), bearing cup (13) and bearing cone (12).

8. Check the condition of lip type seal (14). Replace seal (14) with new if worn or damaged.

9. Repeat steps 7 and 8 for the remaining seal, bearing and spacer in the other side of knuckle (10).

NOTICE

Check the condition of all seals, bearings and components. If any parts are worn or damaged use new parts for replacement.

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10. Lubricate the pins, king pins and bearings.

11. Install the steering knuckle, kingpins and bearings in the reverse order of removal.

End By:

a. Install steer wheels.

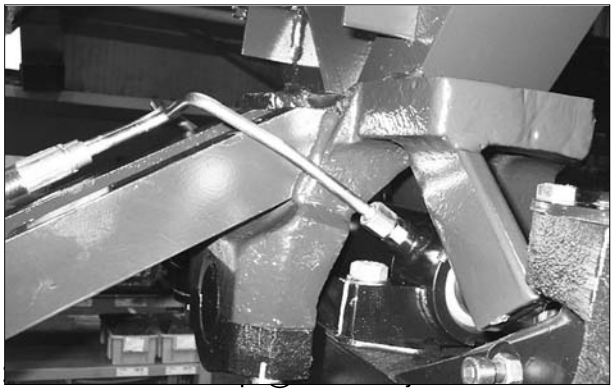
Steer Axle

Remove & Install Steer Axle

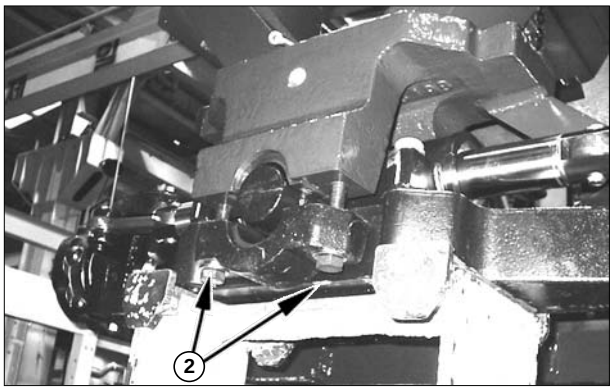
Tools Needed	A
Jack Stand	4

⚠ WARNING

Be sure the pressure in the hydraulic system is released before any lines or hoses have been disconnected.



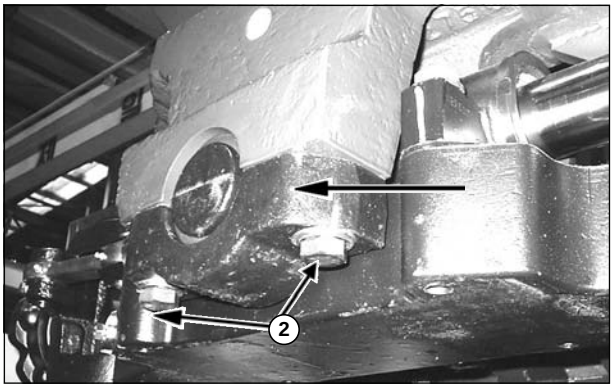
2. Disconnect tube (1). Plug and cap all openings to prevent contamination and debris from entering the system.



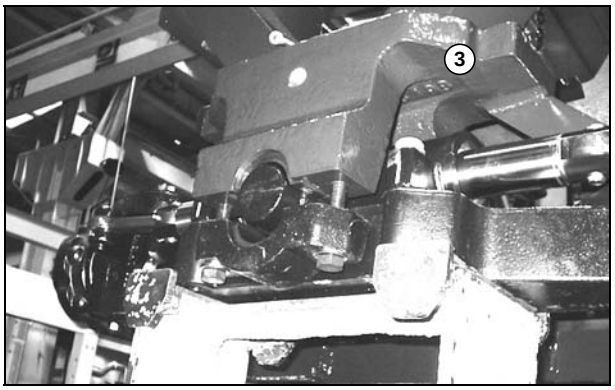
3. Support the steel axle with a floor jack.

4. Loosen mounting bolts (2) until approximately two bolt threads are left in the mounting bosses.

5. Lower the steer axle onto the bolt heads with the floor jack.

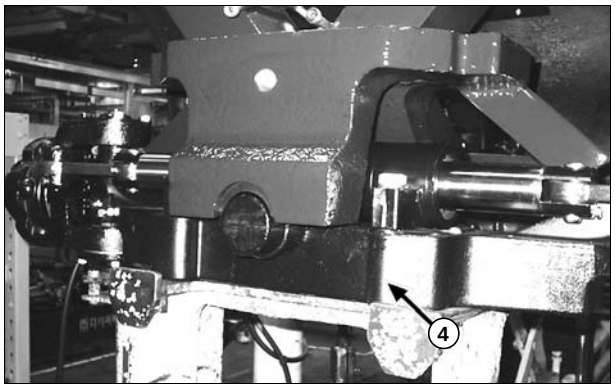


6. Remove bolts (2) and mounting caps (3) from the steer axle.



7. Remove steer axle (4). The steer axle weighs approximately 200 kg (440 lb).

NOTE : Use the following steps to install the steer axle.



8. Use a floor jack to position steer axle (4).

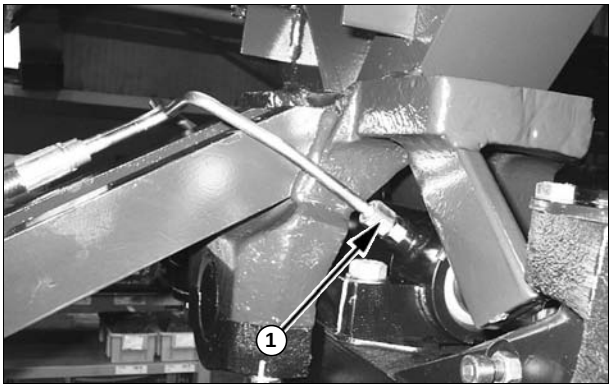
NOTE : Use bolts (2) and cap (3) to align steer axle (4) with the mounting bosses while raising steer axle (4) into position with the floor jack.

9. Seat steer axle (4) as follows:

a. Install bolts (2) through cap (3) and into the mounting bosses approximately two bolt threads.

b. Use the floor jack to raise steer axle (4) into the mounting boss.

c. Tighten bolts (2).



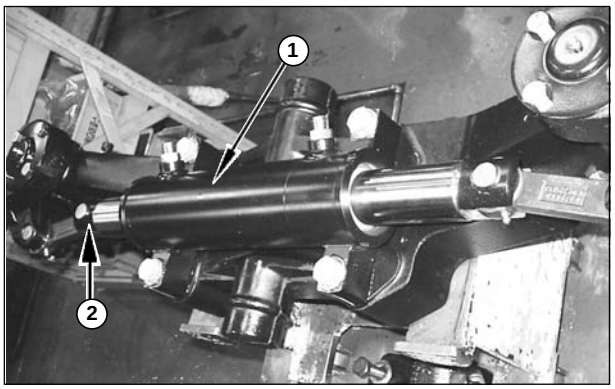
10. Connect tube (1).

Steering Cylinder

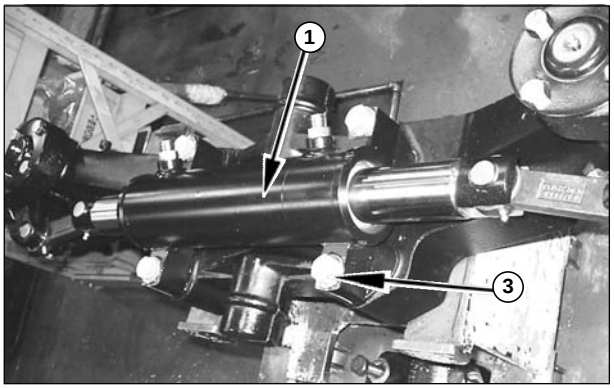
Remove & Install Steering Cylinder

Start By:

a. Remove steer axle.



1. Remove the pin retaining bolt and pin (2) from the tie rod at each end of steering cylinder (1).



2. Remove four bolts (3). For installation purposes, the torque for bolts (3) is **300 ± 40 N·m (220 ±30 lb·ft)**.

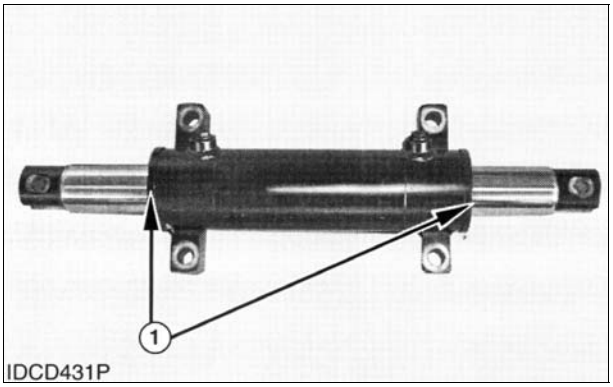
3. Remove steering cylinder (1).

4. Install steering cylinder (1) in the reverse order of removal.

Disassemble Steering Cylinder

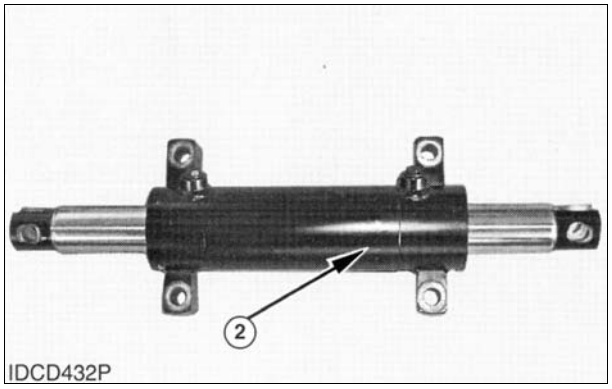
Start By :

a. Remove steering cylinder.

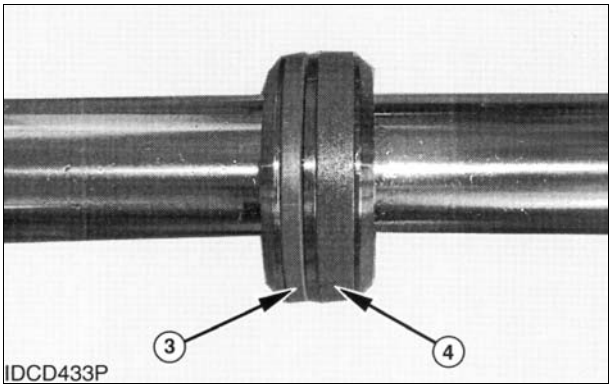


1. Put location marks on end caps (1) as to their position on the steering cylinder tube.

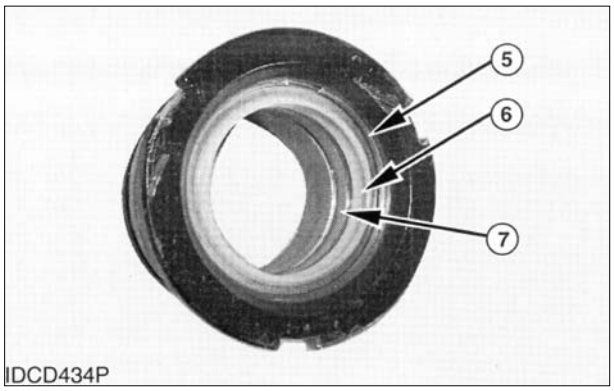
2. Remove end caps (1) from the steering cylinder.

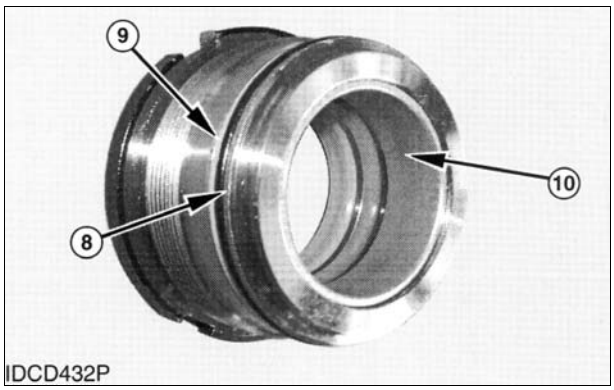


3. Remove cylinder tube (2) from the rod assembly.



4. Remove piston seal (3) and wear ring (4).





5. Disassemble each rod cover as follows.

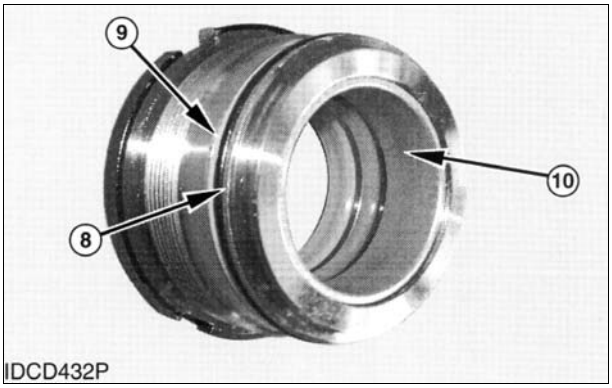
a. Remove retaining ring (5) and dust wiper (6).

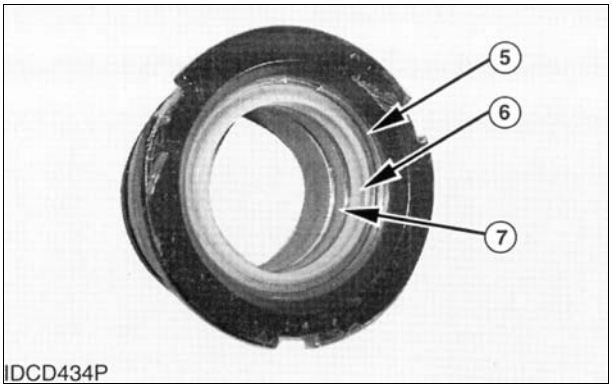
b. Remove U-packing (7).

c. Remove O-ring (8) and back up ring (9).

d. Remove DU-bush (10).

Assemble Steering Cylinder





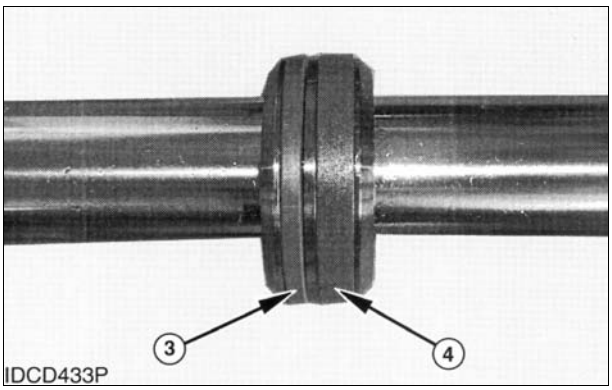
1. Assemble each rod cover as follows ;

a. Install DU-bush (10).

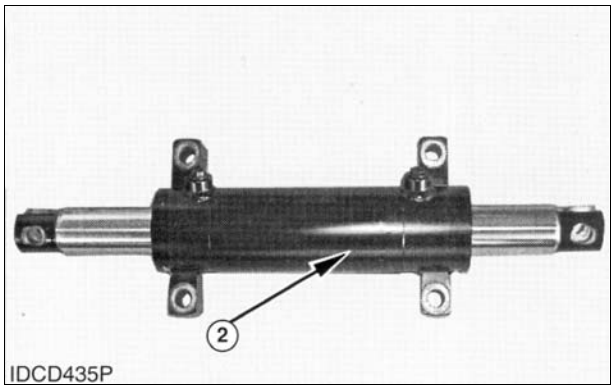
b. Install back up ring (9) and O-ring (8)

c. Install u-packing (7).

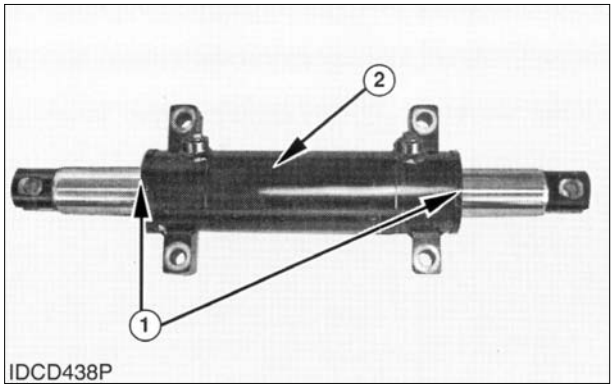
d. Install dust wiper (6) and retaining ring (5).



2. Install piston seal (3) and wear ring (4).



3. Install cylinder tube (2) on the rod assembly.



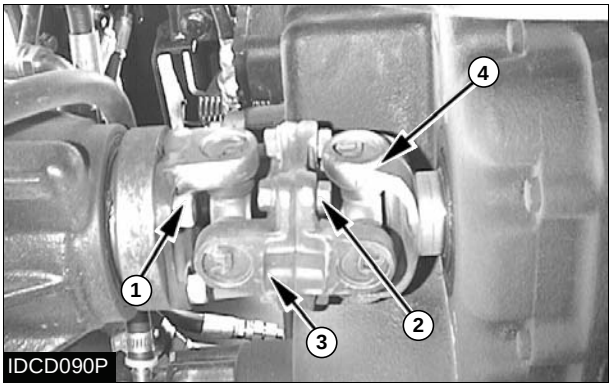
4. Install rod covers (1) on cylinder tube (2).

End By :

a. Install the steering cylinder.

Universal Joint

Remove and Install Universal Joint



1. Remove four bolts (1).

2. Remove four bolts and nuts (2) and flange assembly (3).

3. Remove yoke shaft assembly (4).
Use the following steps to assemble the universal joint.

4. Install the yoke shaft assembly (4) into transmission.

5. Put the flange assembly in the position between the drive axle and the yoke shaft assembly (4).

6. Apply loctite #242 thread lock to threads of the bolts (1) and the bolts (2).

7. Tighten the bolts (1) and the bolts (2) to a torque of 75 ± 5 N·m (55.4 ± 3.7 lb·ft).

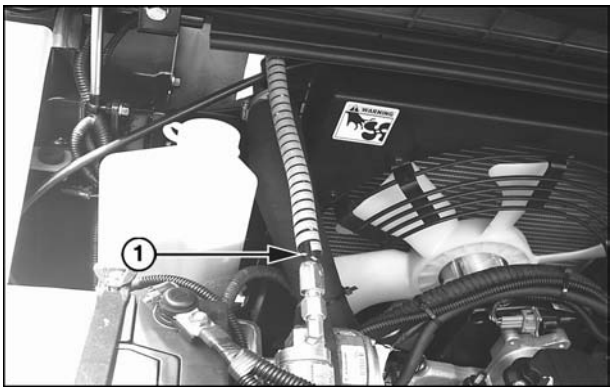
Counterweight

Remove & Install Counterweight

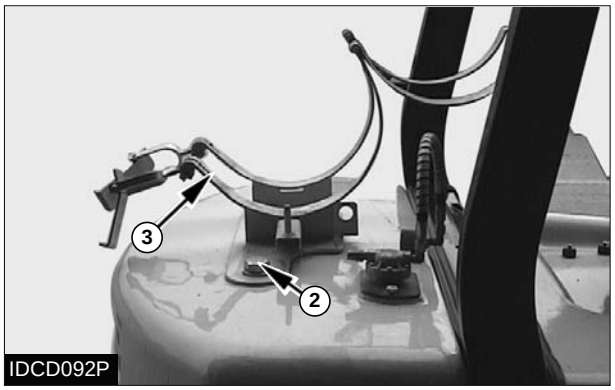
Tools Needed	A
Link Bracket	4

NOTE : Steps 1 through 3 are for L.P. and Gas model machines only. After steps 1 through 4 have been done, the removal procedure is the same for all models. For gasoline model machines, go to step 5.

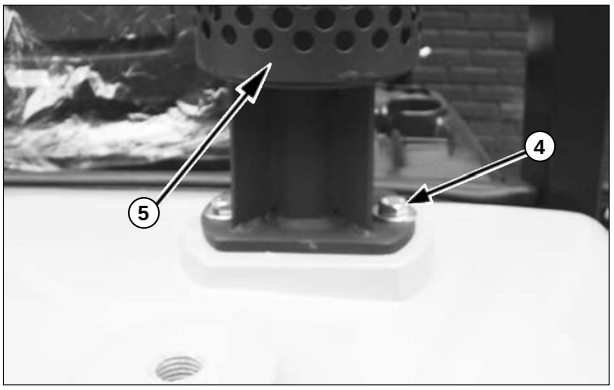
1. Remove the L.P. fuel tank. Refer to the Operation & Maintenance manual for further information.



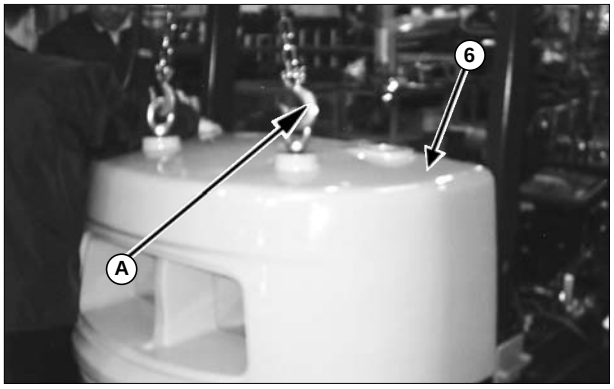
2. Disconnect fuel line (1) from the LP converter.



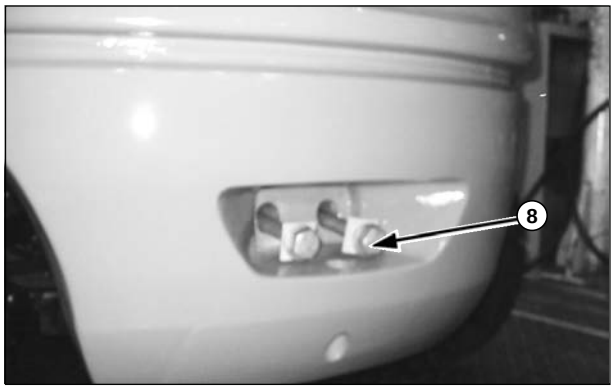
3. Remove the washers and bolts (2) from each side of L.P. tank mounting bracket (3). Remove mounting bracket (3).



4. Remove the washers and bolts (4) and exhaust pipe (5) for the diesel truck.

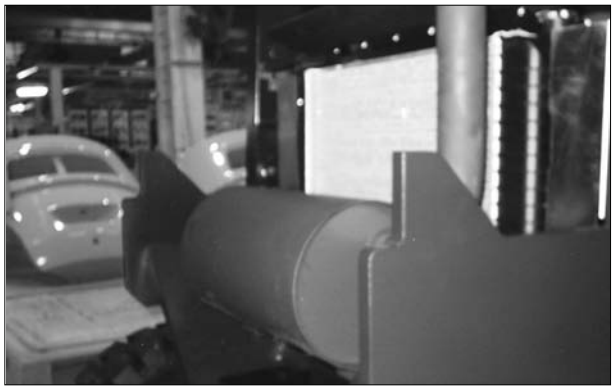


5. Support counter weight (6) with a hoist and tooling (A) as shown.
The weight of the counter weight is approximately 2,100kg (4,630 lb).



6. Remove the washer plate and bolts (8).

7. Use the hoist and tooling (A) to remove counter weight (6). The weight of the counterweight is approximately 2,100 kg (4,630 lb).



NOTE : The following steps are for installation of the counterweight.

8. Put counterweight (6) in position on the frame, and install bolt (8) and bolts (9). Tighten the bolts to a torque of 400 ± 60 N·m (300 ± 45 lb·ft).

NOTE : This completes the installation of the counter weight for gasoline model machines. For L.P. Gas model machines, reverse the procedures and Steps 1 through 3 and 5 to complete installation of the L.P. tank mounting bracket and gas line. For diesel model machines, reverse the procedures and steps 4 through 5 to complete installation of exhaust pipe and cover

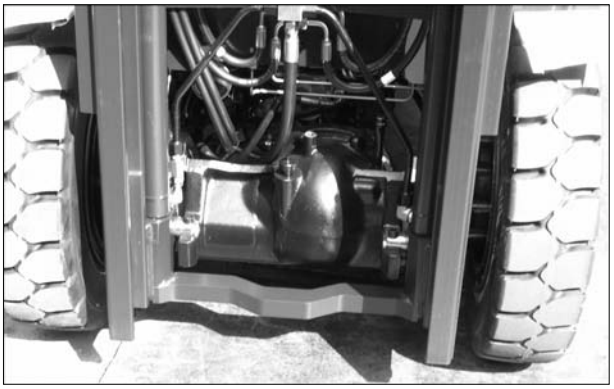
Removal and Installation of Drive axle

Start by :

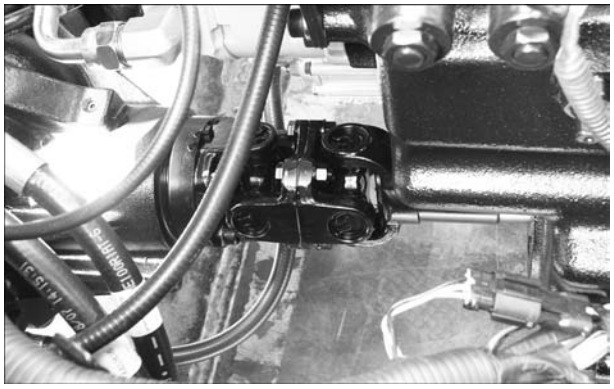
a. Remove the mast.
Refer to the topic of " Mast " in this module for the further information.

b. Remove the drive tire.

c. Drain the drive axle oil.

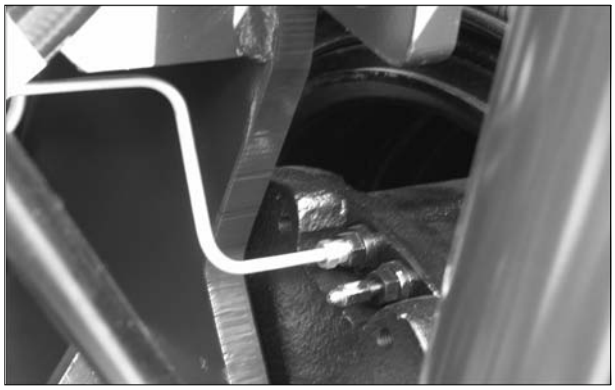


1. Raise the machine and put the rigid block under the frame. To be safe.

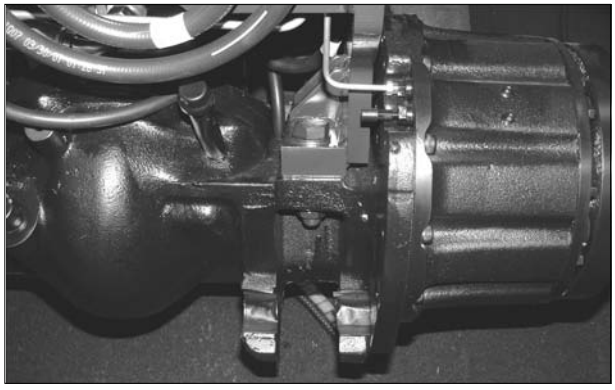


2. Disassemble the u-joint. For the purpose of reassembly, apply MoS2 grease on the spline.

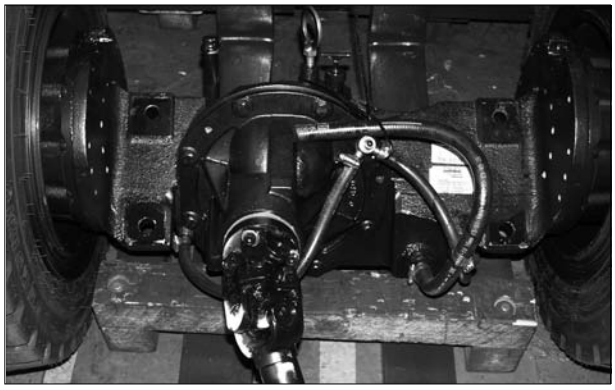
3. Disassemble three hoses to the lube pump.



4. Disconnect the brake tube.



5. Disassemble the nuts for mounting the drive axle. For the purpose of reassembly, the torque is 460 +/- 60 N.m (354 +/- 45 lb.ft).



6. Remove the drive axle.

Removal of Transmission

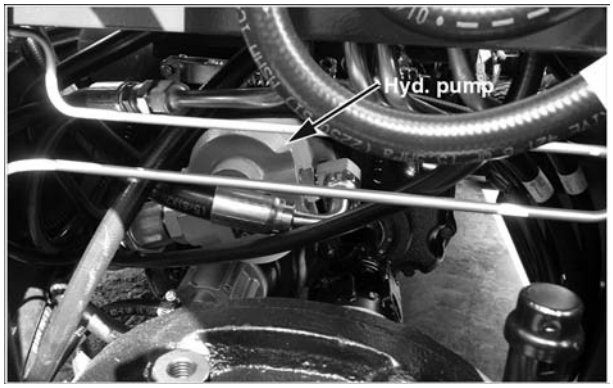
Start by :

a. Remove the mast.
Refer to the topic of " Mast " in this module for the further information.

b. Remove the drive tire.

c. Drain the transmission oil.

d. Disassemble Drive axle.



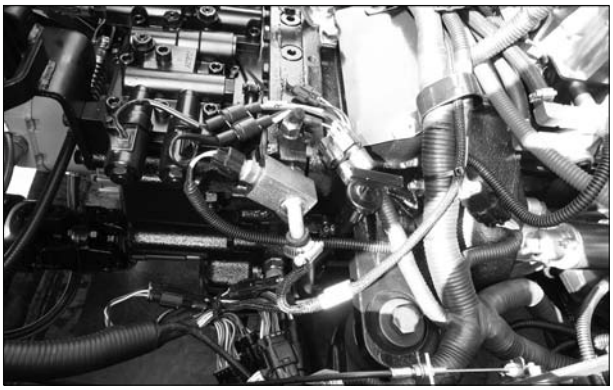
1. Disconnect two hoses assembled to the hydraulic pump.

2. Disconnect the inching cable.

3. Dismount the accel pedal.

4. Disconnect the parking cable.

5. Dismount the front plate.



6. Disconnect all harnesses, connectors and hoses.

7. After removing the trans. housing cover, disassemble the torque converter plate from the flywheel. For the purpose of reassembly, the torque is 45 +/- 7 N.m (34 +/- 5 lb.ft).

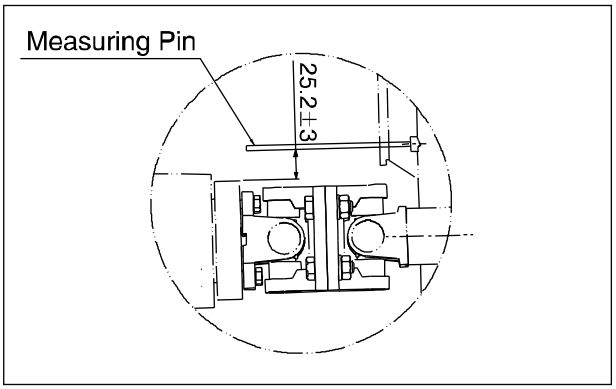
8. Suspend the transmission and engine by hoist, separately.

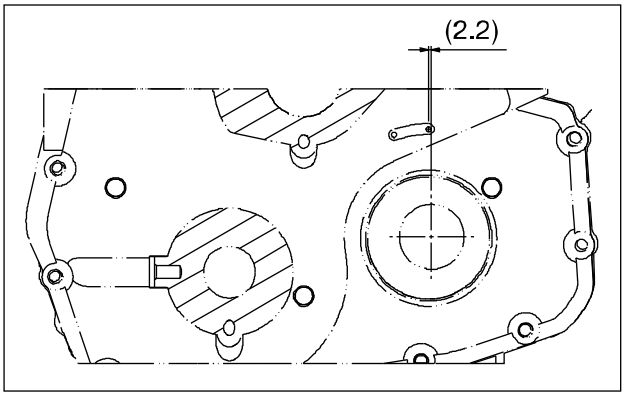
9. Reassembly in the reverse order of disassembly. For the purpose of reassembly, the torque of bolts for mounting the transmission is..... .....240 +/- 40 N.m (180 +/- 30 lb.ft).

10. Adjust the powertain assembly after inserting ∅4 mm pin into the hole of trqnsmission housing

<Pneumatic truck>

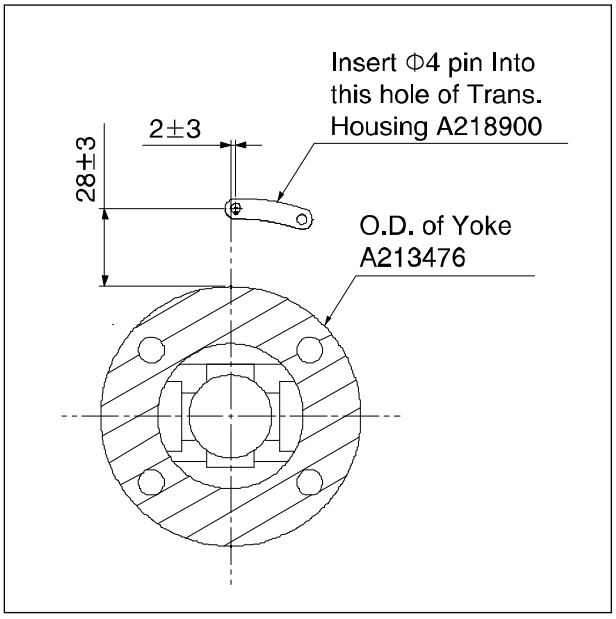
< Unit : mm >

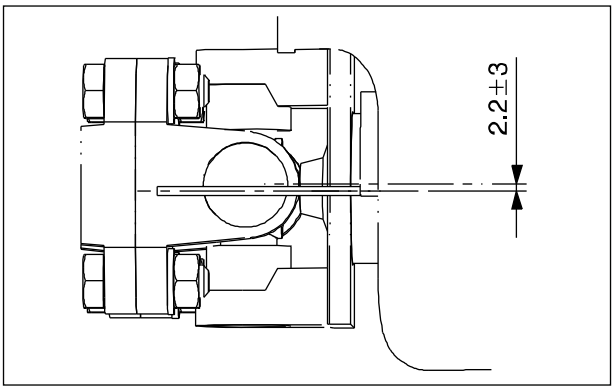


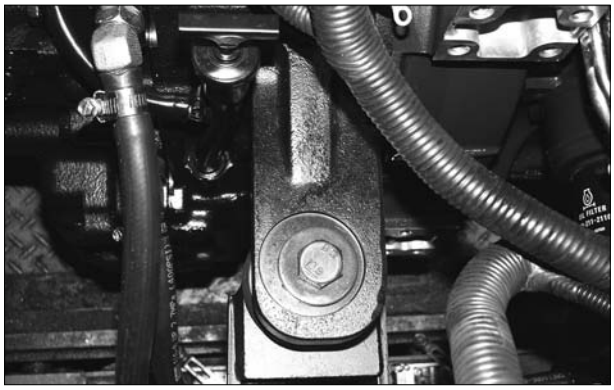


<Cushion truck>

< Unit : mm >







11. Dismount the transmission from the engine.

Removal and Installation of Engine

Start by :

a. Remove the mast.
Refer to the topic of " Mast " in this module for the further information.

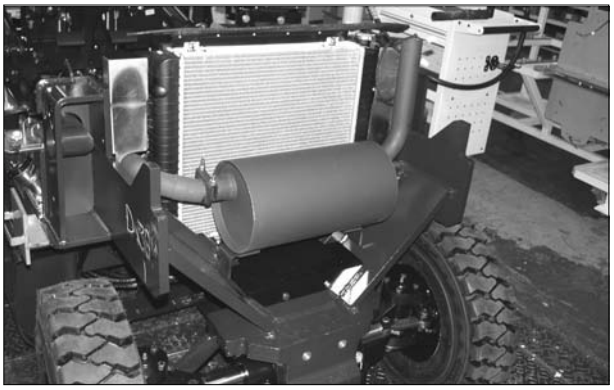
b. Remove the drive tire.

c. Drain the transmission oil.

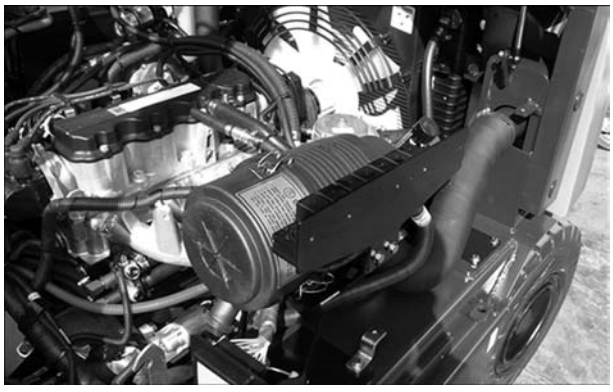
d. Drain the engine oil.

e. Drain the coolant.

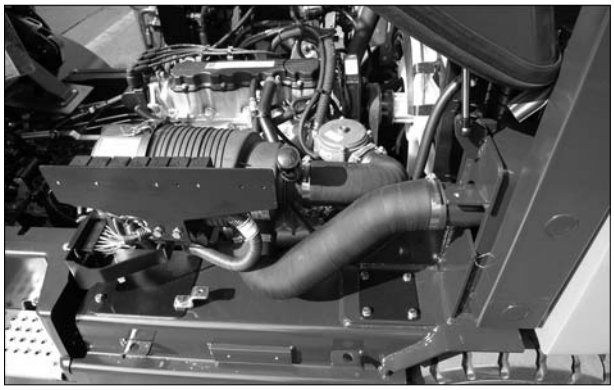
f. Disassemble Drive axle.



1. Dismount the overhead guard, hood and counter weight.

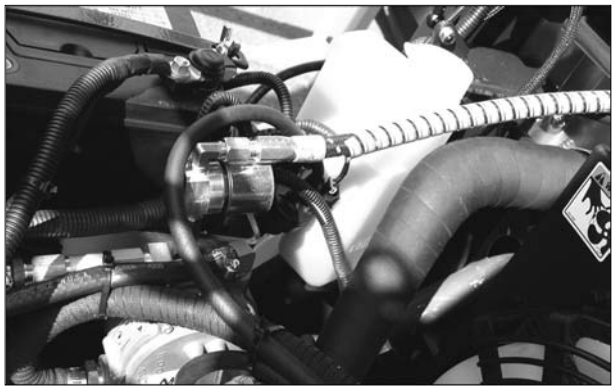


2. Dismount the radiator.

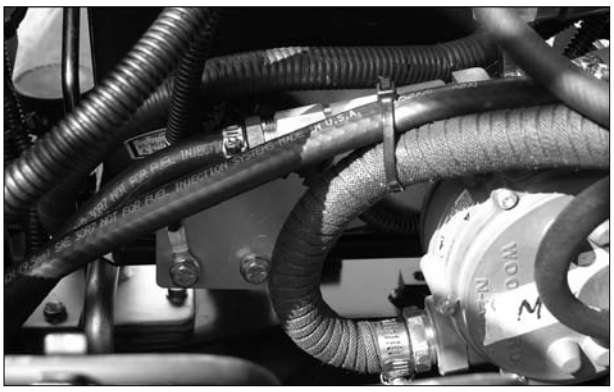


3. Dismount the air cleaner and hose to the intake.

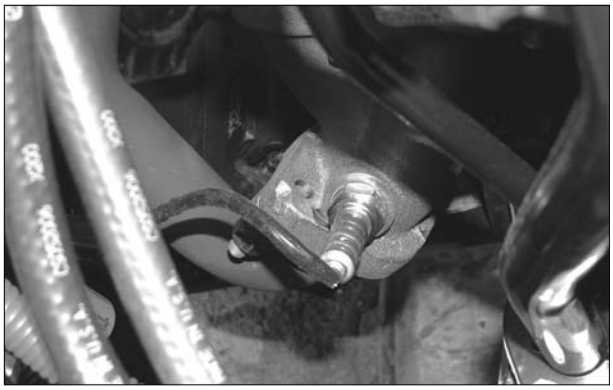
4. Disconnect the battery cable and dismount the battery.



5. Disconnect LP hose to fuel lock.

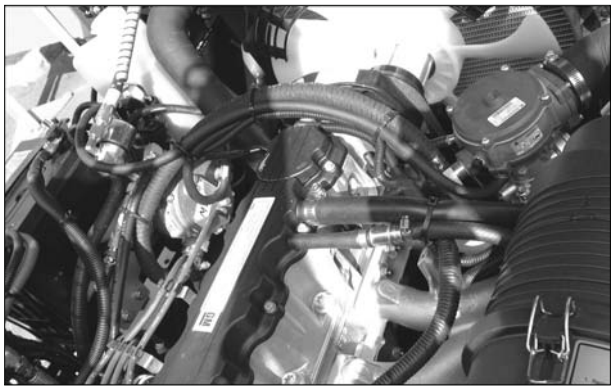


6. Dismount the sub. Assembled LP Regulator.



7. Disconnect the exhaust tube.

8. Disconnect all harnesses, connectors to the engine.



9. Disconnect the coolant hose to LP regulator.

10. Dismount the assembled transmission and engine together.

11. Discount the transmission from the engine.

12. Reassembly in the reverse order of disassembly. For the purpose of reassembly, the torque of bolts for mounting the transmission is 240 +/- 40 N·m (180 +/- 30 lb·ft). The torque of bolts for mounting the engine is 55 ± 10 N·m (40±8lb·ft) with Loctite # 262.